NETWORK WORLD

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INTERNETWORKING

Role reversal: LANs over SNA

Third in a four-part series on SNA/LAN integration.

BY SKIP MACASKILL

Systems Network Architecture users may well recognize the need to support multiprotocol LAN traffic along with traditional SNA data, but they are often loath to move critical SNA traffic onto router-based internetworks.

New router supports SNA and WAN backbones. Page 8.

In order to maintain the high reliability they have come to expect from their SNA nets, some users are taking a different tack — running multiprotocol local-area network data over existing SNA backbones.

Users opting for this LAN-to-LAN over SNA approach have a choice between two basic kinds of software-based gateway/routers.

The first type encapsulates LAN data in Synchronous Data Link Control packets and ships it across the SNA net to remote LANs via the host and front-end processor (FEP). The other type uses an LU 6.2 session to forge a direct link across the SNA net between remote LANs, bypassing the FEP.

Durham, N.C.-based Central Carolina Bank & Trust Co. (CCB) is embracing the SDLC approach to ship Network Basic I/O System data across its SNA network, which links its corporate data center in Durham to approximately 110 LANs in branch offices lo-

See **Role reversal**, *page 51*

Codex switch to marry data on frame relay nets

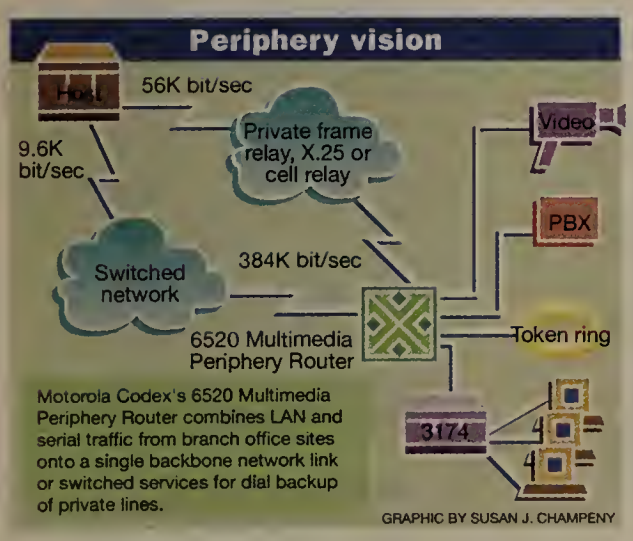
BY JIM DUFFY

Mansfield, Mass.

Motorola Codex this week will unveil a frame relay switch for branch office sites that combines LAN and serial data over a single network access link.

The 6520 Multimedia Periphery Router, Motorola Codex's first frame relay switch, is a seven-slot device sporting five integral serial ports and a 20M bit/sec Industry Standard Architecture bus. The slots house local- and wide-area network interface cards and, in the future, will support voice, video and a proprietary cell switching module.

The product will help migrate the company's installed base of users to distributed LAN internetworks combining voice, data and video. Motorola Codex's other homegrown switches do not support frame relay switching and cannot combine serial and LAN traffic with voice and video.



Malik Khan, Motorola Codex's vice president of marketing, confirmed that the 6520 will be announced this week but did not provide further details.

The unit's cell switching module will support wide-area speeds of up to 2M bit/sec, or E-1, according to sources familiar with its development. Analysts

See **Codex**, *page 51*

NEWSPAPER

A brief history of APPI

1992

Sept.
Cisco Systems, Inc. announces Advanced Peer-to-Peer Internetworking (APPI) as an open, no-cost alternative to IBM's proprietary and pricey Advanced Peer-to-Peer Networking (APPN).

Oct.
APPI Forum debuts with 13 vendors as founding members.

Dec.
IBM moves to open up APPN by submitting Data Link Switching (DLSw) and APPN-over-TCP/IP Sockets specifications to the IETF for consideration as standards.

1993

Jan.
Quieting criticism, IBM scratches $400,000 APPN licensing fee and makes Network Node specs available for less than $1,000.

March
IETF makes DLSw an informational request for comment, giving non-IBM vendors free access to the spec. IBM offers intellectual property package to third-party developers for approximately $10,000, which covers APPN copyrights, patents and trademarks.

April
IBM dissolves in-house board overseeing APPN development and forms APPN Implementors Workshop, open to other vendors.

Aug.
Cisco halts APPI development, licenses APPN and says APPI Forum will decide whether to close down or continue developing APPI.

Cisco abandons plan for APPN alternative

High-profile APPI effort now all but dead.

BY MAUREEN MOLLOY

Menlo Park, Calif.

Cisco Systems, Inc. caught its partners and the rest of the network industry off guard last week when it abruptly ended its bold initiative to develop an open alternative to IBM's Advanced Peer-to-Peer Networking (APPN).

Citing potential violations of IBM patents as an obstacle to the development of its Advanced Peer-to-Peer Internetworking (APPI) architecture, Cisco said it will license the source code and intellectual property rights needed to implement IBM's APPN Network Node in its routers. Cisco will also adopt IBM's Data Link Switching (DLSw) for transporting Systems Network Architecture data across multiprotocol backbones.

"We're not going to battle IBM on this any longer," said Michael Zadikian, Cisco's SNA product manager. "Increased cooperation between Cisco and IBM will benefit the industry."

John Steigerwald, IBM's manager of software development and support for the 6611 router, agreed. "We're not surprised about APPI's demise. There will be a big reduction in confusion among users," he said. "We're all on an APPN track now, and that'll allow users to make firmer plans."

Cisco designed APPI, which combines SNA peer networking with Transmission Control Protocol/Internet Protocol features, to address technical deficiencies in APPN. It was supposed to enable vendors to provide APPN-like features in their internetwork equipment without incurring IBM license fees and prevent IBM from having an unfair advantage over rivals.

At the time APPI emerged, IBM was under fire for what many perceived as stiff licensing fees for APPN specifications and for not giving other suppliers a role in APPN's development. Shortly after APPI was announced in September, more than 26 vendors agreed to support its development through the APPI Forum.

IBM responded by announcing technical enhancements that make APPN a more elegant solution. But perhaps more importantly, IBM has addressed many of the APPI Forum's criticisms during the past nine months by reducing the cost to license the technology and stripping out many of the proprietary features inherent in APPN. IBM also announced the formation of an APPN Implementors Workshop (AIW) that is open to any vendor or

See **Cisco**, *page 50*

StrataCom ushers in ATM era at T-1 rates

BY MAUREEN MOLLOY

San Jose, Calif.

StrataCom, Inc. last week opened the market for Asynchronous Transfer Mode networks to a far greater number of users with the announcement of an industry-first 1.5M bit/sec ATM interface card for its IPX and BPX fast packet switches.

The company also said its ForeSight congestion control software, currently available on its narrowband IPX switch, will be ported to its Broadband-PX ATM switch by year end to support both ATM and frame relay traffic.

The products will improve the efficiency of ATM nets based on StrataCom equipment and reduce the cost of wide-area ATM deployment as compared to existing equipment, which requires links of 45M bit/sec or higher. They could also open the door for carriers, several of which use StrataCom equipment, to offer T-1 based ATM services.

"Many of our customers are clearly interested in ATM at T-1

See **StrataCom**, *page 51*

Hitachi wares to meld mail directories

BY BOB BROWN

Santa Clara, Calif.

Hitachi Computer Products (America), Inc. (HICAM) next week will unveil Unix software designed to synchronize directories across multiple electronic mail systems.

Expected to debut at INTEROP 93 August, HICAM's Mosaic Works Directory Services will let net administrators maintain a central E-mail directory and give end users on any mail system the address information needed to message other E-mail users across the enterprise.

Directory synchronization is a big issue for E-mail administrators and was the topic of a special joint meeting of the Electronic Mail Association and X.400

See **Synch**, *page 9*

Briefs

You're invited. If you're heading to INTEROP in San Francisco next week, consider yourself invited to a free seminar, "Managing the migration to client/server architectures." Sponsored by *Network World*, the presentation will be produced by Bob Christian, who heads up the Enterprise Networking Practice at Coopers & Lybrand. Christian will discuss technical and management hurdles on the road to client/server, talk about implementation options and field questions from users. The seminar is scheduled for Wednesday, Aug. 25, from 1 p.m. to 1:50 p.m. in Room 122 at the Moscone Center.

MCI chief steps down. MCI Communications Corp. President Daniel Akerson resigned suddenly last week to become chairman of video equipment manufacturer General Instrument Corp. Akerson started at MCI in 1983 as vice president of technology and engineering and became president in 1992. MCI Chairman Bert Roberts will become president on an interim basis when Akerson leaves at the end of this month. Roberts left open the question of a successor.

E-mail community concerned about bill. The Electronic Mail Association (EMA) last week held an emergency session to discuss H.R. 1900, legislation that the E-mail community fear could severely limit E-mail usage. The bill was originally designed to prevent telemarketing firms from electronically monitoring employee performance but has been extended to impose restrictions on many forms of computer communications. The EMA is formulating a response to the legislation and has asked members for their input.

PBX management. AT&T and NCR Corp. have developed a Simple Network Management Protocol agent that enables NCR's StarSentry net management system to manage AT&T's Definity Generic 3 private branch exchanges. The Definity SNMP agent will be available in the first quarter of 1994, with a PBX management application for StarSentry to follow in the second quarter.

Client/server demos, products on tap. IBM will stage a multivendor client/server demonstration at the Client/Server East '93 Conference and Exposition in Washington, D.C. this week. The demo will kick off a 12-city road show called the IBM Client/Server Symphony of Solutions Tour. It will feature IBM products as well as hardware and software from other vendors, including Apple Computer, Inc., Novell, Inc., Sun Microsystems, Inc. and Sybase, Inc. Also at the conference, Uniface Corp. will announce an agreement with Digital Equipment Corp., which will use Uniface's client/server development software to build applications for customers. Intersolv, Inc. will announce a client/server analysis and design tool.

New kid. General DataComm, Inc. last week formed the ATM Business Group to handle development and marketing of its ATM products, including the Advanced Packet Exchange switch.

ATM and dip. Carnegie Mellon University and Advanced Micro Devices, Inc. (AMD) have agreed to develop an Asynchronous Transfer Mode (ATM) "switch on a chip" that can achieve terabit-per-second speeds. AMD paid Carnegie Mellon an initial $1 million fee for exclusive manufacturing rights to the chip, which will be used in ATM switches and other ATM network equipment.

Am I Blue? IBM is expected to announce that PeerLogic, Inc. will license Big Blue's Multiprotocol Transport Networking (MPTN) for use in its Pipes middleware. MPTN is software that lets applications run over any underlying communications protocol. PeerLogic is the third vendor, after Ki Research, Inc. and Proginet Corp., to license MPTN since IBM announced the software last spring.

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We're using an MCI Communications Corp. T-1 line for data exchange between sites across the country. We would like to split up the line to accommodate file transfer among Apple Computer, Inc. Macintoshes at the various sites. Is there some sort of switch we can use or another alternative?

Jeffrey Uhlig, Chicago

Tom Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J., replies:

A simple A-B serial interface switch designed to support the data interface already in use could be employed. However, this would make the data connection "appear" and "disappear" for both the Mac and the current data exchange applications — that is, one application would lose the connection when the other gained it.

That might increase the operator intervention needed to make both applications work because most data devices will detect the loss of a connection and mark it logically "failed." An operator must then restore it.

The switch could be eliminated by allocating T-1 capacity to both applications. Whatever capacity was allocated to one application would be wasted when it was not running, unless the T-1 multiplexer had a way to "recover" unused bandwidth. However, most don't.

A better solution would be to employ a simple frame relay concentrator or a statistical multiplexer to combine both the Mac application and the current application onto a single data connection, letting them "share" whatever T-1 capacity is now being allocated to the data exchange application.

This new concentrator/multiplexer would combine bandwidth from two traffic sources, letting both applications "see" a permanent data connection. It would eliminate the manual task of switching the circuit and reestablishing the logical connection for the application acquiring it. If you

See **Help desk**, *page 38*

CONTENTS

NEWS

6 *Netlink product* to link SNA and frame relay worlds.

6 *NCR to release* UniverCell ATM switches.

6 *DEC to enter* high-end hub fray with DEChub 900.

8 *New router* bridges SNA gap.

8 *Alantec enhances* PowerHubs.

8 *LightStream breaks* into market with ATM switch.

9 *Pittsburgh pair indicted* in 900 scam.

50 *StarWare packs* offer Unix users links to IBM minis.

ENTERPRISE INTERNETS

11 3Com unveils HSSI module for NetBuilder II.

11 Proteon to enhance IBM support on its router line.

11 IBM pumps up NetView Performance Monitor.

14 Column: Hunting for answers with gopher.

16 NetHopper router offers high-speed dial-up links.

17 Software makes error detection a snap in large SNA nets.

17 Frontier Software pioneers RMON for the WAN with NETscout analyzer.

LOCAL NETWORKS

19 SynOptics exec details strategy for net future.

19 SunSoft launches Network File System Version 3.

19 ODS to introduce hubs with switching, routing.

21 NCR expands its NetWare connectivity product line.

GLOBAL SERVICES

28 AT&T details new apps for voice systems.

28 WilTel readying international push.

28 Australians to set up ATM net in 1994.

29 Column: Confidentiality is a must for today's telecom manager.

32 Know the enemy: How hackers ply their trade.

32 Net execs with say in corp. planning get bigger budgets.

CLIENT/SERVER APPLICATIONS

33 Database vendors race to offer NT versions.

33 Groupware maker widens client support.

33 Easel enhances tools for client/server apps.

34 Microsoft releases database links for Windows apps.

35 Column: Client/server hampered by myths and confusion.

FEATURES

36 Opinions/Letters

39 The light has not yet gone out on high-speed private-line market.

42 Action Center

48 Networking Marketplace

49 Networking Careers

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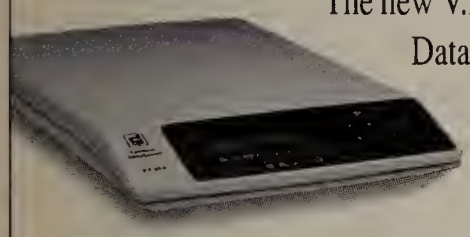

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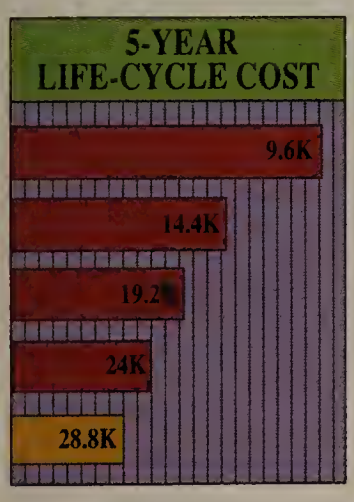

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Netlink product to link SNA and frame relay worlds

BY MICHAEL COONEY

Raleigh, N.C.

Netlink, Inc. this week will announce a device that lets users attach existing Systems Network Architecture equipment to public or private frame relay networks.

Netlink's Frame Relay Access Node (FRAN) converts Synchronous Data Link Control traffic into native frame relay packets, eliminating the need for traditional Frame Relay Assembler/Disassembler (FRAD) products.

SCOTT McKIERNAN

BOWMAN

"We see the FRAN as a feeder node to frame relay-based internetworks," said Michael Bowman, vice president of marketing for Netlink. " It gives users an easy way to run traditional SNA applications over frame relay nets."

Netlink will offer four models of the FRAN, an Intel Corp.-based personal computer running Netlink software.

Models 1 through 3 support two, four and six SDLC ports, respectively, while Model 4 is expandable to 16 SDLC ports. The SDLC ports can support speeds of up to 64K bit/sec. All models support a single V.35 wide-area network interface that operates at up to 128K bit/sec.

Each SDLC port supports devices such as IBM's 3174 cluster controller. The FRAN converts incoming SDLC traffic into frame relay format and sends it over a frame relay net to a bridge/router or front-end processor (FEP).

All models support a single V.35 WAN interface that operates at up to 128K bit/sec.

No additional FRADs or FRANs are needed on the remote end as long as the FEP or bridge/router to which the FRAN is connected can support frame relay traffic.

Other FRAD vendors, such as Sync Research, Inc. and Telematics International, Inc., require a FRAD device at both ends of the frame relay connection.

Multiple FRANs can be connected over the frame relay net to a single port on the FEP or bridge/router, which saves on the cost of interface boards for those devices. Plus, the FRAN performs local SDLC polling, keeping that traffic from traversing the frame relay net.

The Netlink FRAN supports the Internet Engineering Task Force's Request For Comments 1294 and 1490, standards that define how devices communicate over frame relay nets.

Users can manage the device using IBM's NetView, Netlink's InView or any Simple Network Management Protocol management system.

Analysts said the FRAN fits well with IBM's plan to use frame relay as the stepping stone to its future Asynchronous Transfer Mode (ATM) products (*NW,* Aug. 9, page 11).

"The FRAN will let users rather easily migrate from their leased-line networks to a frame relay network without having to swap out any of their existing 3174s," said Lucinda Santisario, an industry analyst with International Data Corp., a market research firm in Framingham, Mass. "It's not fancy, but it'll get the job done."

In order to facilitate the migration to the ATM products it mapped out last month (*NW,* July 19, page 1), IBM said it will in the next year add frame relay support to all of its primary communications devices and computing boxes — such as the 3174, 3172 Interconnect Controller and Application System/400 mid-range system.

All four FRAN models will be available in the first quarter of 1994, with prices ranging from $3,995 for Model 1 to $17,500 for a fully expanded Model 4.

✆Netlink: (800) 638-5465.

NCR to release UniverCell family of ATM switches

ATM module for SmartHUB also in the works.

BY MAUREEN MOLLOY

Dayton, Ohio

As expected, NCR Corp. this week will disclose plans to release a line of local- and wide-area ATM switches that will let users gradually migrate to gigabit-speed cell relay networks.

NCR's new wares will work with all of AT&T's Asynchronous Transfer Mode products, including its Acculink ATM switch family (*NW,* Aug. 9, page 1).

Phil Thomas, NCR's director of architecture for networking hardware, said his company, together with AT&T Paradyne and AT&T Network Systems, will be able to deliver a comprehensive ATM product line.

Joe Noel, director of networking research at Dataquest, Inc. in San Jose, Calif., said the support from the two AT&T units is NCR's strong suit. "The three groups working together to come up with integrated products is significant for the sheer breadth of knowledge that exists there," Noel said. "NCR understands the real use for an ATM switch now, which is as a replacement for FDDI. They've got a large installed base, and the philosophy is to migrate a user rather than rip out everything."

All of NCR's ATM products are based on the Phoenix ATM chipset developed by AT&T Bell Laboratories.

In the first phase of ATM deployment, NCR will provide an ATM switching module for its SmartHUB XE, a modular 10Base-T Ethernet local-area network hub with three 10M bit/sec backplanes. The four-port ATM module is essentially a switch on a card that supports ATM links of up to 200M bit/sec per port, for an aggregate capacity of 800M bit/sec.

The ATM ports can be used to support high-speed links to servers or clients outfitted with ATM adapters or to other ATM work group switches to create local ATM backbones. One of the ports can be configured to support an Ethernet LAN and Ethernet-to-ATM bridging capability, which enables LAN data to be shipped to any ATM port.

The ATM module will be available next summer. Pricing has not been set.

NCR said the switch will be complemented by two 100M bit/sec fiber ATM adapters for connections to servers and workstations.

NCR Asynchronous Transfer Mode family

Model	Number of ports	Port speed (bit/sec)	Switching capacity (bit/sec)	Availability	Price
SmartHUB XE ATM module	4	100M	800M	Summer 1994	NA
Workgroup Switch	4	1.5M	500M	Mid-1994	NA
Departmental Switch	8	51M to 622M	1.6G	End of 1994	NA
Backbone Switch	12	51M to 622M	3.2G	End of 1994	NA

NA = Not available

SOURCE: NCR CORP., DAYTON, OHIO
GRAPHIC BY SUSAN J. CHAMPENY

In addition to the new ATM module for the SmartHUB XE, NCR next year will roll out the UniverCell Switch family, a line of ATM switches. The offerings will address requirements at the work group, departmental and backbone levels, incorporating an array of ATM interfaces as well as support for shared and dedicated LANs.

The four-port Workgroup Switch combines the functions of a hub, multiplexer and router. It is equipped with a 500M bit/sec switching capacity that supports wide-area interfaces at speeds up to T-1 and local links at up to 51M bit/sec. It will be available in mid-1994. Pricing has not been set.

Targeted at small office or work group environments, the Workgroup Switch uses ATM to multiplex voice, data and video traffic, which can then be forwarded to the Departmental Switch.

Multiple eight-port 1.6G bit/sec Departmental Switches can be used to form a campus backbone on their own or in conjunction with the 12-port 3.2G bit/sec Backbone Switch. The latter can also be used as a feeder node to the AT&T wide-area switches.

The Departmental and Backbone switches can support local- and wide-area ATM links ranging from 51M bit/sec to 622M bit/sec. All three can be managed by any Simple Network Management Protocol-based net management system.

The Workgroup Switch will be available in mid-1994, while the higher capacity switches will ship by the end of next year. Pricing was not available.

A prototype of the UniverCell switch will be demonstrated at INTEROP 93 Fall next week.

✆NCR: (513) 445-5200.

DEC to enter high-end hub fray with DEChub 900

BY JIM DUFFY

Maynard, Mass.

Digital Equipment Corp. this week will enter the high-end hub market when it unveils the DEChub 900 MultiSwitch, a switching hub with a 2.3G bit/sec backplane that will eventually bring users into the world of ATM networking.

Initially, the DEChub 900 is expected to support shared-media Ethernet, token-ring and Fiber Distributed Data Interface local-area networks. But DEC plans to ultimately support Ethernet, token-ring and FDDI switching, which will enable the hub to establish high-speed dedicated links — 10M bit/sec, 4M/16M bit/sec or 100M bit/sec, respectively — between devices on the network. LAN switching can increase performance, aid in network segmentation and support multimedia applications.

DEC confirmed that it will announce the DEChub 900 this week but declined further comment. DEC disclosed development of the hub last fall (*NW,* Oct. 19, 1992, page 6). According to analysts briefed by the company, the DEChub 900 will support a multiswitch extension backplane that will occupy two of the hub's eight slots. The backplane provides a channelized switching fabric that allows users to create multiple logical configurations of Ethernet, token-ring and FDDI LANs.

Other hubs from vendors such as Bytex Corp., Chipcom Corp. and Ungermann-Bass, Inc. also support multiple logical LAN configurations.

The six other hub slots can house LAN, bridge, router and terminal server modules. Each Ethernet module will sport eight ports, meaning the DEChub 900 can support as many as 48 Ethernet ports. The channelized multiswitch backplane will allow users to create a maximum of 12 logical Ethernet segments.

Total token-ring and FDDI LAN capacity could not be determined by press time.

Observers speculate that the routing module for the DEChub 900, which will initially support DECnet/OSI, DECnet Phase IV, Transmission Control Protocol/Internet Protocol and X.25 protocols, will support IBM's Data Link Switching (DLSw) technology and Synchronous Data Link Control-to-Logical Link Control 2 (LLC2) conversion. This will enable it to route IBM Systems Network Architecture traffic over an IP backbone supported by DEC's DECNIS 500 and 600 backbone routers (*NW,* Aug. 2, page 49).

DLSw defines how SNA is encapsulated in TCP/IP. That definition includes SDLC-to-LLC2 conversion, which changes SDLC frames to LLC2 packets so they can be routed across an internet backbone.

The DEChub 900 will eventually support Asynchronous Transfer Mode modules, which will allow the device to segment LAN packets into 53-byte ATM cells and send them to an ATM switch. The ATM module is expected in mid- to late 1994.

Sometime after that, the DEChub 900 is expected to support an ATM backplane that will allow it to receive, switch and forward ATM cells (*NW,* March 15, page 9). It will be manageable from Simple Network Management Protocol consoles, according to analysts.

They added that DEC, although lacking market share, has a credible product to pit against hub leaders. "For the first time, DEC's got a competitive high-end hub offering," said Peter Raulerson, president of Para Technology, Inc., a Bellevue, Wash., consultancy. "How are competitors going to respond?"

The DEChub 900 is expected to be available by the end of the year. Pricing could not be determined as of press time.

✆DEC: (800) 344-4825.

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New router bridges SNA gap

BY MICHAEL COONEY

Torrance, Calif.

IBM users leery of committing their multimillion-dollar Systems Network Architecture resources to LAN internetworks now have the option of supporting both environments from a single bridge/router.

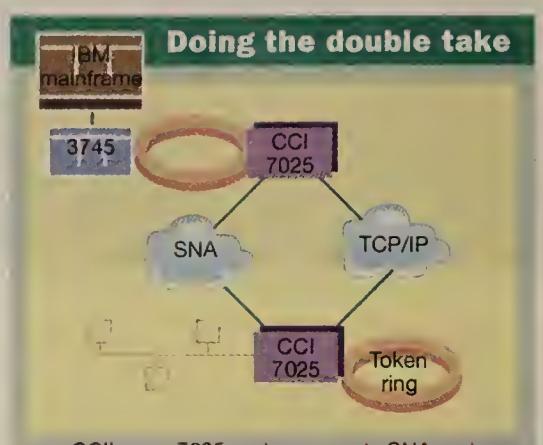
At next week's INTEROP 93 Fall, Computer Communications, Inc. (CCI) will introduce the Eclipse 7025, which supports both SNA and multiprotocol internet backbones, and enables users to gradually migrate traffic from the SNA net to the internet backbone.

The product is based on CCI's 7020 SNA/local-area network interconnection system, which lets Novell, Inc.'s Internetwork Packet Exchange (IPX) and Network Basic I/O System data flow over SNA nets.

It adds routing capabilities that support prioritized routing of SNA traffic over the internet backbone and the ability to route Transmision Control Protocol/Internet Protocol data over the SNA net. The 7025 supports the Open Shortest Path First, Routing Information Protocol and Point-to-Point Protocol protocols.

"Traditional bridge/router vendors do not support SNA backbones. Instead, they force SNA users to move lock, stock and barrel to a TCP/IP-oriented backbone to support LAN-to-LAN traffic," said Raymond High, president of CCI. "Most SNA users are uncomfortable with that and don't want to be forced into moving business-critical information to technology they are uncomfortable with, namely TCP/IP."

The 7025 is a Reduced Instruction Set Computing device with two LAN ports for Ethernet or token ring and up to four wide-area connections.



CCI's new 7025 router supports SNA and TCP/IP backbones simultaneously.

SOURCE: COMPUTER COMMUNICATIONS, INC. (CCI), TORRANCE, CALIF.
GRAPHIC BY TERRI MITCHELL

The wide-area ports can be configured to support four 19.2K bit/sec or two 56K bit/sec Synchronous Data Link Control links and four point-to-point serial ports or two frame relay links at speeds of up to T-1. For example, users can design the box to support one TCP/IP wide-area network link and three SNA/SDLC links and swap out the SDLC links as they need more TCP/IP connectivity, High said. This lets SNA users migrate to TCP/IP line-by-line.

Current users of the Eclipse 7020 can get the new capabilities through a software-only upgrade priced at $9,975.

The 7025 can be managed by IBM's NetView or any Simple Network Management Protocol manager.

Analysts said the 7025 will make for a strong SNA-to-TCP/IP migration tool, even though it will require users to essentially maintain two backbones — a feat experts do not generally advocate.

"The 7025 recognizes reality more than any other router solution because SNA users just aren't going to switch over to TCP/IP overnight," said Ed Taylor, author of *Integrating TCP/IP into SNA* and an independent consultant based in Fort Worth, Texas.

The 7025 is priced at $15,000 and will be available, along with the 7020 software upgrade, in the second quarter of 1994.

✆CCI: (800) 421-1176.

Alantec enhances PowerHubs

BY SKIP MACASKILL

San Jose, Calif.

Alantec Corp. last week introduced an IP multicast routing feature for its PowerHub intelligent switching hub, providing users with a building block to support multimedia applications over existing Ethernets.

Multicasting allows multiple types of traffic — voice, data and video — to be broadcast to a select group of users across a local-area network. Multicast routing is especially important for multimedia applications in which different types of traffic are being integrated, such as in desktop videoconferencing.

Broadcasting packets to every station eats up bandwidth and degrades performance. But multicasting — which targets specific users — makes more efficient use of resources, said Yancy Lind, director of marketing at Alantec. Other applications that benefit from multicasting include delivery of television broadcasts to the desktop, video mail and interactive video training.

With Internet Protocol multicasting, one PowerHub user sends traffic to the hub, which then forwards that traffic to a select group of users who take part in the multimedia session.

The applications can be supported across different LAN segments linked by other PowerHubs through the Distance Vector Multicast

See **Alantec**, *page 50*

LightStream breaks into market with ATM switch

BY SKIP MACASKILL

Cambridge, Mass.

LightStream Corp. last week made its debut in the increasingly crowded Asynchronous Transfer Mode (ATM) market with an enterprise backbone switch that offers integrated WAN and LAN capabilities.

The LightStream 2010 ATM switch will initially be used to build private ATM-based backbones and support a variety of subnets, including frame relay, X.25 and Systems Network Architecture-based nets.

The product represents the fruits of a technology development agreement that Bolt Beranek and Newman, Inc. (BBN) and Ungermann-Bass, Inc. signed over a year ago to market and manufacture ATM products.

The two vendors last month decided to spin that work off into a separate but jointly owned company in order to better focus the effort.

The 2010 is a 12-slot enclosure that can support a range of local- and wide-area network interfaces, as well as integrated bridge/router functionality.

"We are squarely positioning this product at the enterprise switch level," said Robert Bellman, currently vice president of BBN's broadband business development unit, which will move to LightStream when the company is formally established by the end of the year.

The core of the device is the Concurrent Cell Switch (CCS), which is a board-level matrix switch that has 10 input and 10 output ports, with each path supporting dedicated throughput of 200M bit/sec, giving the device an aggregate capacity of 2G bit/sec.

The switch, which occupies one slot in the 2010, will automatically reroute around failed connections, and users can add an optional second switch module to the enclosure for redundancy.

A Network Processor module also takes up a slot in the 2010 and handles a variety of functions, including the ability to create and tear down virtual circuits on the fly, maintain networkwide routing information and perform other net management features.

Like the CCS, users can add a second Network Processor to the configuration for redundancy.

The remaining slots will be filled by a combination of WAN and LAN interface modules that the user can mix and match as needed.

Initially, LightStream will offer WAN interfaces that include a two-port module supporting T-3 speeds of 45M bit/sec and E-3 rates of 34M bit/sec.

The two-port module will provide interswitch trunking capabilities and support ATM's User Network Interface.

The company will also provide an eight-port WAN module supporting frame relay access, frame forwarding for X.25, High-Level Data Link Control, Synchronous Data Link Control and interswitch trunking at speeds ranging from 56K bit/sec to the 1.5M bit/sec T-1 rate.

LightStream will add native LAN interface modules supporting token ring, Ethernet and Fiber Distributed Data Interface in mid-1994, as well as bridging, multiprotocol routing and support for the 155M bit/sec data rate.

The company plans call for constant-bit-rate voice and video support in the third phase of the rollout, which should occur around the end of next year, allowing users to consolidate data, voice and video traffic on one backbone. Until LightStream is officially formed, BBN will market the product.

UB will resell the device as the EagleSwitch, which will complement the company's existing Ethernet switching product — the DragonSwitch.

"With DragonSwitch, we can meet our users' switching needs at the desktop, and EagleSwitch will address the backbone portion of the network," said Anand Parikh, general manager of UB's broadband networks business unit who will also be moving on to LightStream.

The two products can interact via UB's Virtual Network Architecture technology, which allows users to create and manage an almost unlimited number of virtual LAN segments across the enterprise.

The 2010 will be available early this fall. Pricing will start at $25,000, depending on configuration.

✆BBN: (617) 873-2000; UB: (800) 777-4562.

Synch

Continued from page 1

Application Program Interface Association held in June (*NW*, June 21, page 1).

The lack of directory synchronization standards and products has put many E-mail managers in the unenviable position of manually synchronizing directories, which is a time-consuming and error-prone task. Others have resorted to developing their own automated synchronization systems.

"There's just no way to keep directories up-to-date manually. As a result, messages don't always go through," said Fred Stein, director of software marketing for HICAM's Network Products Group. "That can hurt E-mail's credibility within an organization. E-mail can be a cross-platform application enabler, but it needs to be reliable if management is going to commit to it."

Due in October, HICAM's Mosaic Works Directory Services 1.0 will consist of Directory Server and Directory Agent software that works in tandem to propagate directory updates across multiple E-mail directories.

HICAM's offering will be a software-only product, unlike other multivendor, multiprotocol directory synchronization products that come bundled with messaging switches.

The Directory Server has a Master Directory Database that serves as a central repository for E-mail addresses in the X.400 Originator/Recipient (O/R) name format.

The server initially will run on Sun Microsystems, Inc. SPARC-based Unix platforms and support a maximum of 10 E-mail systems.

The Directory Server will run on Hewlett-Packard Co.'s 9000 Reduced Instruction Set Computing systems in Version 1.2, which is due out in the second quarter of next year.

The Directory Agents run in background mode on local E-mail servers. They feed the Directory Server updates from local E-mail systems and receive information from the server on changes to other E-mail directories.

The agents feature a rules-based engine that converts the local address changes — which are entered manually by the local E-mail administrator — into the X.400 O/R name format and forwards them to the Directory Server at predetermined intervals.

The engine features a filtering function that enables it to determine whether updates to "unlisted" addresses should be propagated across the net.

STEIN

Intially, the agents will be available for mail systems that support the Simple Mail Transfer Protocol (SMTP), X.400 and, via a gateway, the Message Handling Service (MHS).

Release 1.1 of the agent software, due out in the first quarter of 1994, will support cc:Mail on DOS and Windows, as well as Microsoft Corp. Microsoft Mail on Apple Computer, Inc. Macintosh and Windows platforms.

Release 1.2, which is due in the second quarter next year, will support CE Software, Inc.'s QuickMail.

The server and agent components of HICAM's software communicate with each other using a version of Retix's Directory Exchange (DX) protocol, a specification Retix has pitched as a possible industry standard.

HICAM has tweaked DX, which typically works with X.400, to use SMTP, a Unix-based mail transport protocol. HICAM refers to the enhanced version of DX as SMTP over DX, or SDX.

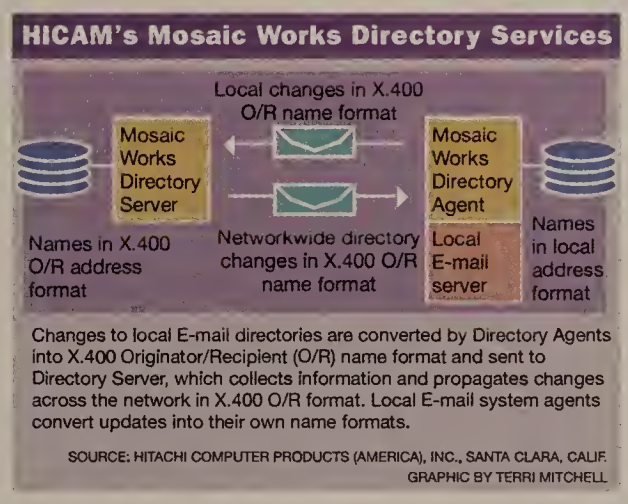
HICAM's Stein noted that even though the company's directory synchronization product is based on the SMTP version of DX, users can implement it in both SMTP backbone and multiprotocol backbone environments by using gateways.

According to HICAM, there are more than two million SMTP users.

The entire Mosaic Works system can be managed by an E-mail administrator from a console linked to the Directory Server. The console provides the administrator with a graphical map of the server and agents, and enables the administrator to print out status reports.

Nina Burns, president of Creative Network Solutions, a San Francisco E-mail consulting firm, said directory synchronization is an important consideration for users but HICAM's offering may have limitations.

Although SMTP is a widely used protocol, it is not the E-mail backbone protocol of choice for many users, she said. It is more common to find users with proprietary E-mail backbones or moving to X.400, she added.



She also questioned HICAM's reliance on the Retix DX specification, which is not widely implemented, despite its endorsement by major players.

Mark Gibbs, president of Gibbs & Co., a Ventura, Calif., consulting firm, said Mosaic Works Directory Services is a unique product that should save users the time and expense of building directory synchronization systems.

"Directory synchronization is a huge and fundamental issue that needs to be addressed if E-mail is going to be moved about a heterogeneous network in a meaningful way," he said.

As for using the established SMTP standard and the Retix DX specification, Gibbs said, "Using those standards makes more sense than [HICAM] building their own."

An entry-level configuration supporting as many as 1,500 addresses will cost $2,495, while a basic configuration supporting a maximum of 5,000 addresses will cost $4,995.

An enterprise version supporting 20,000 addresses or more will cost $9,995 and be available in the first quarter of next year. Each agent will cost $995.

The product will go into beta testing shortly. It is the first E-mail product developed for U.S. distribution by HICAM's Network Products Group.

©HICAM: (408) 986-9770.

Ambitious plans

Hitachi Computer Products (America), Inc. (HICAM) has ambitious plans for its Mosaic Works Directory Services that include providing a migration path to the X.500 directory services standard and SQL database support.

HICAM has committed to adopting directory synchronization standards being developed by the X.400 Application Program Interface Association that will provide a migration path to X.500.

HICAM will also position its software to serve as a bridge between X.500 products and users' existing electronic mail systems.

HICAM will also promote the concept of "phantom agents" for other E-mail systems where it doesn't make sense for HICAM to build specific Directory Agents, said Fred Stein, director of software marketing for the HICAM's Network Products Group. This capability should be available early next year, he added.

HICAM will also support E-mail application program interfaces, such as Microsoft Corp.'s Messaging API. This will enable users on some local E-mail systems to directly access the Mosaic Works Directory Server for information, rather than local E-mail directories, which may have limitations.

Another planned enhancement is support for SQL databases at the Directory Server. This would enable the server to be used for applications other than directory synchronization, such as human resources and other applications that need access to user information — other than the person's name and E-mail address — on a network.

BY BOB BROWN

CLARIFICATION

In a July 26 interview with Paul Weichselbaum, MCI Communications Corp.'s vice president of data marketing, *Network World* interpreted Weichselbaum's comments to indicate that MCI would offer an Internet directory service. The company says it has no plans to offer an Internet directory service at this time.

Pittsburgh pair indicted in 900 scam

BY BILL BURCH

Pittsburgh

Two Pittsburgh men have been charged with defrauding AT&T of $552,000 through a 900-number scam.

Keith Maydak, 23, of East McKeesport, Pa., and Shawn Kovack, 23, of North Huntingdon, Pa., were indicted on July 26 by a federal grand jury in Pittsburgh for allegedly defrauding AT&T in 1991 by setting up a 900 account, then calling the number some 50,000 times and charging the calls to fraudulent accounts. They accepted $552,000 in payments from AT&T for revenues due on calls to the number, according to the indictment.

"Once you're connected, click, a check mark goes up at $33.33 a call," said Assistant U.S. Attorney Paul Hull. "It became an accounts payable for them at AT&T."

The two used AT&T's MultiQuest Broadcaster, a 900 service that information providers can use to broadcast live or recorded information to callers. As part of the service, AT&T funnels payments for the calls to the service provider. In the Pittsburgh case, the defendants are said to have piled up $1.686 million in credits with AT&T.

Maydak is alleged to have set himself up as president of Confidential Services of America, an information brokerage that claimed to provide confidential business information such as data on companies' foreign bank accounts, Hull said.

After arranging for a 900 number with AT&T, the men then traveled the country, stopping in Arkansas, California, Oregon and Pennsylvania, to place calls to their 900 number using phone accounts set up with fraudulent names, according to the indictment.

From May 1991 to November 1991, the duo "made, or caused to be made," $1.686 million in 900 calls to the number, the indictment states.

At that time, the FCC did not yet require preambles for 900 numbers, a short statement that explains charges for a 900 call. Without a preamble to wait through, Maydak and Kovack would have been able to reach 50,000 calls more easily than they could today by simply dialing the 900 number, connecting to the service, then quickly hanging up and calling again.

The scheme's key component hinged on AT&T's payment cycle. Under the Broadcaster service agreement, the information provider is due payment within 30 days of the end of the month in which a call is made. That rule let the defendants collect for some of their calls before AT&T had been paid by local carriers, which handle collections for 900 calls.

The two may have been caught when AT&T realized it had paid out more than $500,000 for what turned out to be uncollectible accounts, although the carrier is not saying. Maydak and Kovack were pinched while attempting to collect on an additional $1.134 million in 900 billings from AT&T.

The pair's alleged actions attracted many law enforcement organizations, including the Internal Revenue Service, the Federal Bureau of Investigation, the Secret Service and local police departments.

Maydak could be sentenced to up to 150 years in prison and fined up to $4.750 million. Kovack faces a 45-year prison sentence and a $1.5 million fine.

No money has been recovered in the case.

Since the incident, AT&T has tightened security on its 900 services. The carrier now does background checks on information providers. Also, AT&T has stretched out its payment cycle for new customers to 90 days, and the carrier is now examining call detail reports on 900 services.

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Proteon to enhance IBM support on its router line

Company to also deliver new mid-range router.

BY MAUREEN MOLLOY

Westborough, Mass.

Proteon, Inc. this week will announce a number of enhancements that will enable its routers to better support IBM Systems Network Architecture data across multiprotocol backbones.

The vendor will also announce new net management options for its internetworking gear, as well as a new member of its Corporate Network Exchange (CNX) router family targeted at large regional sites and an agreement with Novell, Inc. to improve support for NetWare local-area networks in Proteon routers.

In the IBM arena, Proteon announced it will support Data Link Switching (DLSw) technology, an IBM-developed method for transmitting SNA and Network Basic I/O System traffic over Transmission Control Protocol/Internet Protocol backbones. DLSw also lets routers locally acknowledge receipt of SNA frames on behalf of remote devices to help conserve wide-area network bandwidth and prevent SNA session time-outs.

The DLSw specification is currently an informational request for comment pending at the Internet Engineering Task Force.

The vendor said it will add extensions to the DLSw specification, including its own SNA prioritization feature and its Multicast Open Shortest Path First capability.

The latter capability is a group addressing scheme that enables the router to send a single message across a WAN link and have it distributed to multiple recipients on the remote end.

DLSw support will be available in the first quarter of next year at no additional charge as part of Proteon's next software release.

In addition, Proteon will add support by year end for IBM's LAN Network Manager (LNM), which manages token-ring nets. That will enable users to monitor, control and configure Proteon routers from the IBM management system, which also supports a link to IBM's host-based NetView management system.

LNM agents within the router forward management information on a Logical Link Control 2 connection to an LNM station.

LNM support will be available this fall as

See **Proteon,** *page 16*

Snapshot of Proteon router enhancements

1. Support for IBM Data Link Switching and LAN Network Manager.
2. Support for Novell, Inc. NetWare Link Services Protocol and IPXWAN specification.
3. Introduction of the Corporate Network Exchange (CNX) 400, a new mid-range router.
4. Extended net management support via a new PC-based version of Proteon, Inc.'s OneView. In the future, Proteon will port its SNMP-based router applications to Hewlett-Packard Co.'s OpenView and IBM's NetView/6000 platforms.
5. Phase 1 of Asynchronous Transfer Mode (ATM) support via an ATM interface card for CNX routers.

GRAPHIC BY SUSAN J. CHAMPENY

3Com unveils HSSI module for NetBuilder II

BY MAUREEN MOLLOY

Santa Clara, Calif.

3Com Corp. last week announced additions to its high-end NetBuilder II router that will give it higher speed wide-area network links, twice as many fiber Ethernet ports and improved reliability.

The first enhancement is the addition of a single-port High Speed Serial Interface (HSSI) module that supports full-duplex connections of up to 52M bit/sec, the Synchronous Optical Network Optical Carrier-1 rate, which is necessary to prevent bottlenecks when linking high-speed local-area nets such as Fiber Distributed Data Interface over a WAN.

3Com will support the next generation of Novell, Inc. NetWare's IPX protocol.

The HSSI high-speed WAN module will also enable users to link the router to an Asynchronous Transfer Mode (ATM) net once 3Com delivers software support for the ATM Data Exchange Interface protocol on its NetBuilder II, which it plans to do next year. The HSSI module will be available by year end. Pricing has not been set.

3Com also announced a two-port Ethernet 10Base-FL module that doubles from eight to 16 the number of fiber-based Ethernet connections supported on the router. It reduces the cost of fiber backbone connections since the module costs less than two of the previous modules combined and will also require fewer router chassis when expanding the net. The module eliminates the need for external fiber transceivers by providing a direct Fiber Optic Inter-Repeater Link connection to the router via built-in transceivers. The Ethernet 2-port 10Base-FL module costs $1,995 and will be available next month.

3Com also announced a Flash Memory Drive card that is based on the Personal Computer Memory Card International Association standard and includes a 4M-byte flash random-access memory card that will support larger capacity Flash Memory Drive erasable programmable read-only memory (EPROM) cards as they become available. One such EPROM card will enable users to download software reconfigurations and upgrades from a central site. The Flash Memory Drive costs $2,995 and will be available next month.

Finally, 3Com announced added fault tolerance on NetBuilder II via a new Dual Power Supply Unit. The load-sharing supplies are hot-swappable and compatible with the installed base of the NetBuilder II chassis. The Dual Power Supply Unit will be available by year end. Pricing has not been set.

Similarly, 3Com last week announced it will support Novell, Inc.'s NetWare Link Services Protocol, the next generation of NetWare's Internetwork Packet Exchange (IPX) protocol that promises to improve the scalability and performance of IPX-based internets.

The vendor said it will also implement Novell's IPXWAN specification, which defines how various protocols should interoperate with IPX over wide-area links, ensuring interoperability between 3Com and Novell equipment.

✆3Com: (408) 764-5000.

BRIEFS

Network Systems Corp. (NSC) last week announced several new features for its 6600 family of routers, including packet prioritization, support for single-mode fiber connections and a source route bridging to transparent bridging (SR-TB) capability.

Packet prioritization lets users set forwarding priorities based on protocol type so that time-sensitive traffic can be shipped first to minimize session time-outs.

The single-mode fiber connection will let let users link a 6600 router to a Fiber Distributed Data Interface net at distances of up to 40 km, compared to the 2 km maximum available with multimode fiber. The SR-TB algorithm lets users bridge traffic between token-ring and Ethernet local-area nets. The 6600 enhancements are available now as a free upgrade.

NSC: (612) 424-4888.

Combinet, Inc. announced an Ethernet dial-up bridge, Everyware 150, that provides net access to a central local-area network via a public switched net. The unit plugs directly into an Ethernet port on a remote personal computer, Macintosh, Unix workstation or X terminal and can be configured remotely by a network administrator at a central site.

Available in September, Everyware 150 costs $990. The bridge is also available for $495 to students, faculty and administrators at participating educational institutions.

Combinet: (408) 522-9020.

IBM pumps up NetView Performance Monitor

BY MICHAEL COONEY

Raleigh, N.C.

IBM has announced it will make improvements to its NetView Performance Monitor (NPM) that will give SNA users a real-time view of network performance data and help them respond to net problems more quickly.

NPM is a VTAM application that collects Systems Network Architecture and Token-Ring local-area network performance data from VTAM on the mainframe and from the Network Control Program on the front-end processor. It lets users monitor session response times and track data flow. Armed with the data from NPM, users can spot bottlenecks, manage data traffic volume, tune and load-balance their SNA nets.

"Users will be able to see what's happening on their LAN bridge segments or their SNA network as it's operating," said John Byzek, business area manager for network and systems management solutions at IBM.

Users will be able to monitor their nets from a new OS/2 Presentation Manager-based graphical monitor communicating with the mainframe via an LU 6.2 pipe.

The OS/2 monitor can be directly linked to the mainframe, or it can reside on a Token-Ring LAN.

The new interface replaces the existing character-based 3270 interface. It will be easier to navigate and is capable of displaying more information on one screen than the current version.

"In the past, users had to flip through multiple screens to see everything," Byzek said. "Now they'll be able to monitor SNA and LAN performance from one integrated screen."

SNA users will be able to gather more information about their SNA resources with the new NPM. For example, for the first time, they will be able to monitor VTAM's buffer pools, which expand and contract as data flow increases and decreases.

Users will also be able to see the links between individual devices and VTAM, letting them watch for specific problems.

In addition, the new NPM will automatically learn the enterprise topology, so users no longer have to predefine devices and configurations to NPM.

Byzek said beta testing should be completed by October, and the product should be available in six to nine months. He did not disclose pricing.

✆IBM: (919) 301-5928.

Announcing the first network printer

Operating System	*Topology*
Novell Netware	**Ethernet/802.3*
	Token Ring (4/16 Mbps)
Microsoft®	**802.3*
LAN Manager	*Token Ring (4/16Mbps)*
Windows for	**802.3*
Workgroups	*Token Ring (4/16 Mbps)*
Windows NT	**802.3*
	Token Ring (4/16 Mbps)
IBM LAN Server	**802.3*
	Token Ring (4/16 Mbps)
AppleTalk	**LocalTalk*
	**EtherTalk*
*HP-UX***	**Ethernet*
*SunOS***	**Ethernet*
*Solaris***	**Ethernet*
SCO UNIX®	**Ethernet*

*Standard in the HP LaserJet 4Si MX printer. **For operating HP-UX, SunOS or Solaris, a one-time purchase of $199 in configuration software is required. Adobe and PostScript are trademarks of Adobe Systems Inc. which may be registered in certain jurisdictions. Microsoft is a U.S. registered trademark of Microsoft Corporation. UNIX is a registered trademark of UNIX System Laboratories Inc. in the U.S.A. and other countries. †In Canada call 1-800-387-3867, Ext. 7299. © 1993 Hewlett-Packard PEI2353

Multiple environments are no longer worlds apart. Even if you have Novell Netware on one network, HP-UX on another and EtherTalk on a third, the new HP LaserJet 4Si MX printer easily connects across platforms. Automatically.

The HP LaserJet 4Si MX printer comes out-of-the-box preconfigured for multiple environments. There's nothing more to do than plug-and-play. All interfaces are simultaneously hot, making switching so seamless, end-users won't even notice.

What's more, HP's LaserJet 4Si MX printer is ready to handle whatever needs come down the

that adapts to multiple environments.

pike. More operating systems? No problem. As your network system continues to evolve, the capabilities of this printer are no longer just impressive. They're indispensable.

The HP LaserJet 4Si MX printer is loaded with features that define state-of-the-art. HP's enhanced PCL5 and genuine PostScript™ Level 2 software from Adobe™ come standard. Printer environments are saved while switching. Setup is a cinch with network software utilities and drivers included in the box. And, if you need any reassurance about trouble-free operation, you have it in our Simple Network Management Protocol (SNMP) support.

At 17 ppm, this is the fastest LaserJet ever, with I/Os and RISC-based formatter capabilities matched to support its speed. It delivers impeccable 600 dpi print quality—thanks to HP's microfine toner and Resolution Enhancement technology. Plus, it comes standard with two 500 sheet input trays.

But what if you don't need the full capabilities of the HP LaserJet 4Si MX printer right away? HP offers another printer that's probably a perfect fit. The HP LaserJet 4Si printer delivers the identical 17 ppm performance and superb 600 dpi print quality. It also has room to grow. The two MIO expansion slots let you add HP JetDirect network interface or third party cards. And you can add on Adobe's genuine PostScript Level 2 software and SIMM memory modules, as you need them.

To find out more about the multiple-network HP LaserJet 4Si MX printer and the upgradable HP LaserJet 4Si printer just call 1-800-LASERJET, Ext. 7299.† Capabilities this advanced make a world of difference—in any environment.

HEWLETT PACKARD

by Ed Krol

Hunting for answers with gopher

In my last column, I introduced some of the questions from the Internet Hunt, a monthly information scavenger hunt (*NW*, June 28, page 12). Having frustrated you since then, it's time to come through with some answers.

Gopher is the single tool that would allow you to answer the most questions in the hunt. When you contact a gopher server, you are presented with a series of menus.

It does not matter which gopher server you start on, find a menu that says something like "Contact other gopher servers," and select it.

Once you are there, you are on your way to finding the answer to the first scavenger hunt question — I'm writing a paper about how wars conclude. Could you tell me where I can find the terms of the Japanese and German surrenders at the conclusion of World War II?

Choose "USA gopher servers," "California," and then the "University of California Santa Cruz infoslug" gopher.

This puts you in touch with the server that has the information; now you need to find the documents themselves.

So pick the menu item "The library," then "Electronic books and other texts" and, finally, "Historical documents." There you will find the requested items.

To answer the next question — What is the postal code for Daly Waters, Northern Territory, Australia? — you need to travel a bit further.

Where you chose "USA" servers under "Other gophers and information servers" before, choose "Pacific" instead. Under that menu, select the "Australian National Botanical Gardens" gopher.

First choose "Contacts, addresses, telephones for the ANBG," then "Australian postcodes." Finally, choose "Look up a postcode" and type in "Daly Waters," and it will tell you its postal code.

The easiest way to answer the final question — Who said, what is the use of a book...without pictures and conversations? — is to leave gopher and do a remote login using telnet to info.rutgers.edu.

This will get you into Rutgers University's information system, an intuitive, menu-driven system.

Next, type the selection "Library," then "Reference" and, finally, "Familiar." It will ask you for a word to search for; try "conversations."

The answers to all of these questions were obviously available on-line on the Internet, but the big question — How did I find the answers? — remains.

Gopher is the single tool that will allow you to answer the most questions in the Internet hunt.

All of the answers could have been found through a gopher tool called Veronica.

Veronica periodically builds an index of all gopher menu items on the Internet. Under the "Other gophers and information servers" menu, there is also an item such as "Search gopher menus with Veronica."

If you had chosen that menu item, it would have asked you to type in a few key words (for example, Australian postal codes), and then it would have taken you directly to the answer.

Of course, your other alternative would have been to ask a librarian.

Note: If you don't have a gopher client software on your usual home system, there are public gopher servers available using Telnet at the following sites:

- consultant.micro.umn.edu with login gopher
- ux1.cso.uiuc.edu with login gopher
- panda.uiowa.edu with login panda
- gopher.uwp.edu with login gopher

Krol is author of *The Whole Internet* (O'Reilly & Associates, Sebastopol, Calif., 1992) and assistant director for LAN deployment at the University of Illinois at Urbana-Champaign. He can be reached at e-krol@uiuc.edu.

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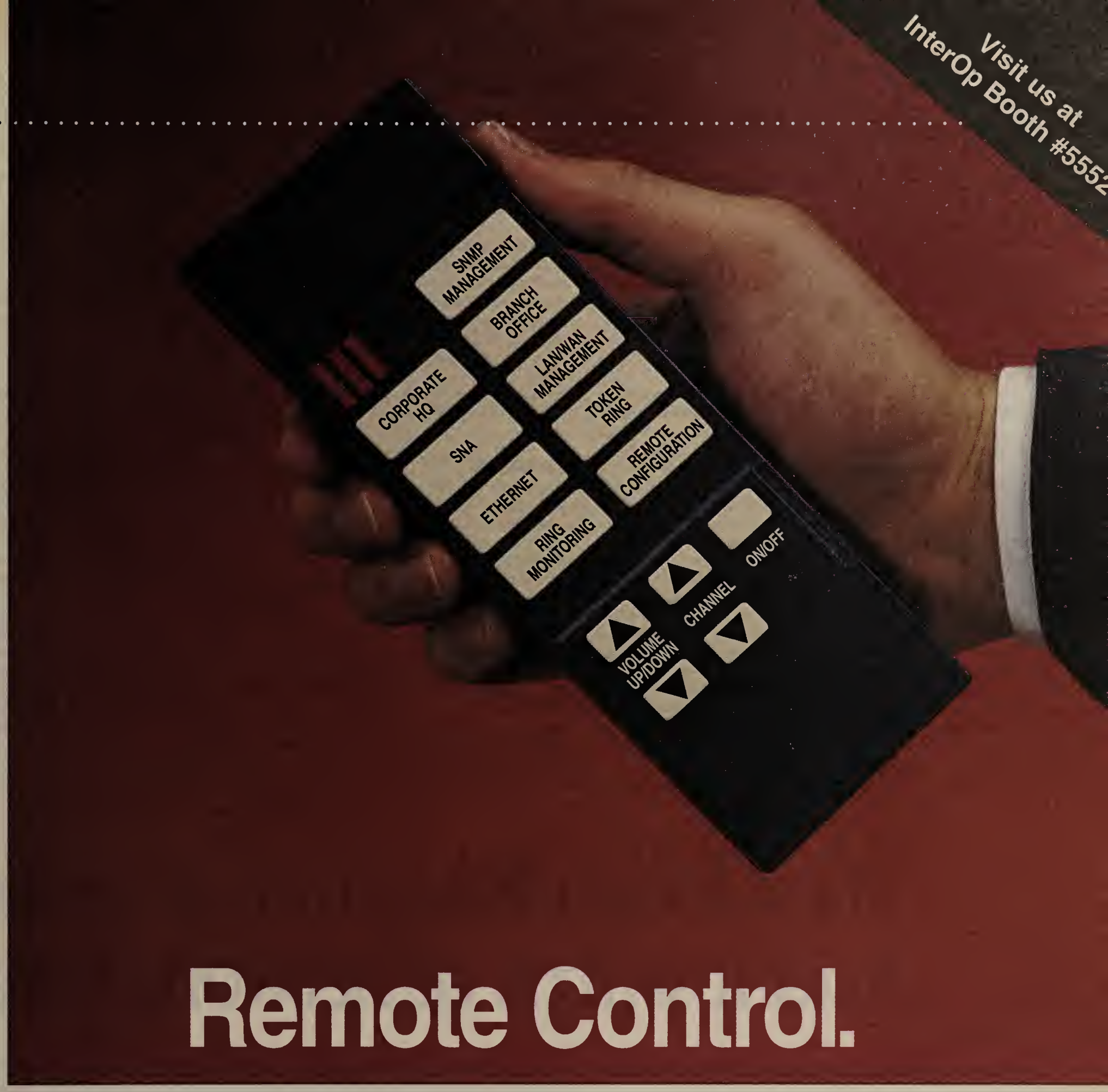
MANAGEMENT



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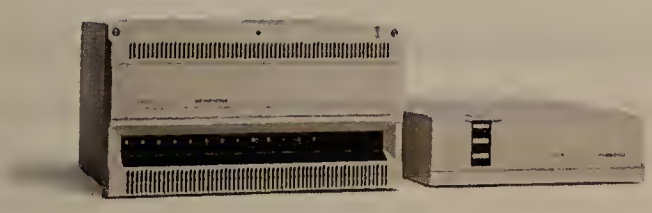
InterOp Booth #5552

Remote Control.

If only automating branch offices were this easy...

But since your business network is more complicated than switching T.V. channels, we've created a solution.

The Racal-Datacom™ INX™5000 Intelligent Wiring Hub, today's best solution for Token Ring at the branch office.

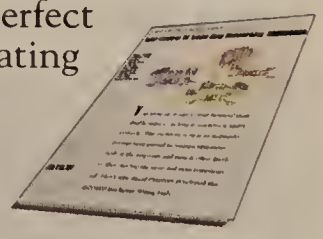


Integrating remote LANs into your existing SNA network has never been easier or more cost effective.

The INX5000's unique "3-in-1" feature, with lobe connections, ring in/ring out and network management, provides the industry's first complete network all on a single module. This makes every remote network easier to set-up, service and control.

The entire system provides fault-tolerance, full software configuration and the highest density packaging for the lowest cost of entry. And it's backed by a full range of Token Ring and Ethernet products as well as internetworking expertise that only Racal-Datacom can offer.

So when it comes to putting remote control in your hands, the INX5000 is the perfect choice for automating branch offices.



Free Brochure.

For your free copy of Racal-Datacom's "Take Control of Token Ring Networking" call 1-800-RACAL-55.

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DIAL-UP ROUTING

NetHopper router offers high-speed dial-up links

BY MAUREEN MOLLOY

Santa Barbara, Calif.

The CMC Network Products division of Rockwell International Corp. last week announced a new version of its NetHopper dial-up router that offers faster wide-area links and supports additional protocols.

Dubbed the NH-P, the new router is targeted at remote users that require occasional access to a central local-area network. It routes Ethernet-based Transmission Control Protocol/Internet Protocol traffic and comes equipped with its own integrated modem. The device works with 10Base-T or attachment unit interface Ethernet connections and can automatically detect which of those is in use.

With the NH-P, users at small remote sites can link to the corporate network for electronic mail, file transfer and remote database access as well as access the Internet, all over the public switched telephone network. The router offers bidirectional connections and security features, addressing a concern of users that utilize the public telephone net to transmit data.

The NH-P comes with an integrated V.32 modem, like the previous version, but CMC plans to upgrade the modem to support the V.fast standard once it is ratified. That will double the speed from 14.4K bit/sec to 28.8K bit/sec. The new version also is equipped with V.42bis 4-to-1 data compression, which provides effective throughput of up to 56K bit/sec.

The vendor will add support for Novell, Inc.'s Internetwork Packet Exchange (IPX) this fall and the Data Encryption Standard by early next year.

Also, the 1M byte of random-access memory currently available in the NH-P can be upgraded to 16M bytes to support additional protocols in the future.

The router will also support within the next year Integrated Services Digital Network, as well as switched 56K bit/sec and frame relay services.

The NH-P is equipped with a Simple Network Management Protocol agent and can be managed from any SNMP-based net management system. The vendor said the product will support SNMP Version 2 in 1994.

The NH-P costs $1,695 and will be available in October.

✆CMC: (805) 968-4262.

Proteon

Continued from page 11

a free software upgrade.

Proteon will also announce this week a personal computer-based version of its OneView management platform that currently runs only on a Unix-based platform.

OneView/pc is a Windows-based product that monitors Proteon and other Simple Network Management Protocol-based devices and is targeted at smaller nets with under 100 devices.

OneView will be available next month and cost between $2,995 and $3995.

For large-scale users that have standardized on Hewlett-Packard Co.'s OpenView or IBM's NetView/6000, Proteon said it will port its SNMP-based router applications to those two management platforms.

NEW ROUTER

In an effort to round out its router line and address the requirements of users at large regional sites, Proteon will unveil the CNX 400, a three-slot device that supports up to two Ethernet, token-ring or Fiber Distributed Data Interface LAN interfaces.

On the wide area, CNX 400 supports dual-port interface modules that operate at up to T-1 speeds. All interface boards are interchangeable with Proteon's higher end CNX 500 and CNX 600 routers.

The CNX 400 will be driven by an Advanced Micro Devices, Inc. 29000 Reduced Instruction Set Computing processor and has a packet forwarding rate of 25,000 packet/sec.

In place of a bus architecture, the CNX 400 is equipped with a 2M-byte Packet Buffer Memory that stores data until a routing decision is made.

The product supports the same protocols as the vendor's existing routers, including TCP/IP, DECnet, Internetwork Packet Exchange (IPX), Xerox Network Systems, AppleTalk, VINES, Apollo Domain as well as Open Systems Interconnection protocols.

The CNX 400 is available now and pricing has been set between $3,995 and $11,195, depending upon configuration.

BOOSTING NETWARE SUPPORT

Proteon will also announce an agreement with Novell to support Novell's NetWare Link Services Protocol (NLSP), the next-generation of Novell's IPX protocol that promises to vastly improve the scalability and performance of IPX-based internets.

NLSP is a link-state protocol designed to overcome the drawbacks of IPX, a distance vector protocol that has been criticized for its hop count limitations, excessive bandwidth consumption and cumbersome routing table update methods.

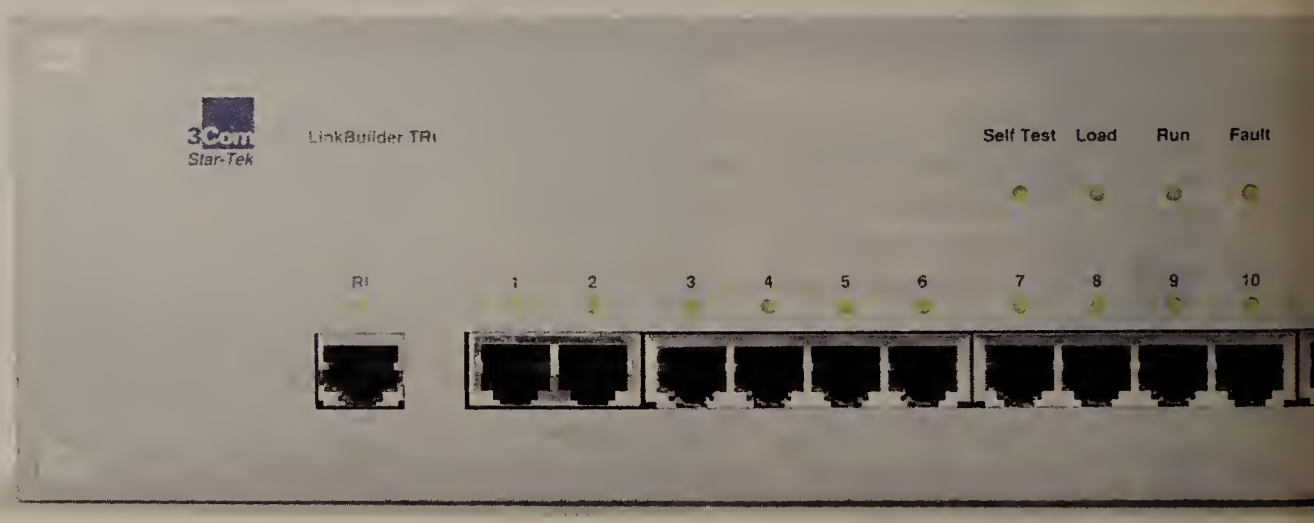
Proteon said it will additionally implement Novell's IPXWAN specification, which defines how various protocols should interoperate with IPX over wide-area links, thereby ensuring interoperability between Proteon routers and Novell routers and servers.

NLSP support will be available in late 1994, while the IPXWAN specification will be available by year end.

Finally, following up on an Asynchronous Transfer Mode (ATM) strategy outlined earlier, Proteon announced it will deliver by mid-1994 an ATM interface for its routers that will enable it to link ATM LANs and WANs (*NW*, Oct. 19, 1992, page 1). The vendor also said it will deliver a cell switching fabric in its next-generation router. No other details were provided.

✆Proteon: (508) 898-2800.

It's a Token Ring hub. It never sto
And it warns of network trouble.



Now there's a Token Ring hub family so advanced there's little left for you to do but take the credit.

It's the LinkBuilder® TR stackable hub and the LinkBuilder Focus™ chassis hubs. And they're found only at 3Com and its new subsidiary, Star-Tek.™

Each Token Ring hub comes with industry-preferred Phase Locked Loop technology on every port, giving you the strongest, cleanest signal possible everywhere on your network. Our hubs support all popular grades of twisted-pair cable to twice the distance of most other Token Ring hubs. So you can stop worrying about your cabling.

LinkBuilder Focus

What's more, 3Com® Token Ring hubs monitor themselves and your network all the time, constantly adjusting for even subtle changes for maximum performance. No other Token Ring hub can match this efficiency or attention to detail.

And unlike other hubs, 3Com Token Ring hubs actually detect and remove faults before they hit your network.

©1993 3Com Corp. (408) 764-5000. 3Com, Networks That Go the Distance, LinkBuilder, Focus, and Star-Tek are trademarks of 3Com Corp.

Software makes error detection a snap in large SNA nets

BY MICHAEL COONEY

Redwood City, Calif.

A new network management tool from Applied Expert Systems, Inc. can make locating problems in large SNA nets less like finding needles in a haystack.

The company's SNA Problem Solver (SNAPS) Version 2 expert systems software takes the guesswork out of Systems Network Architecture troubleshooting by automatically diagnosing common SNA problems and promptly recommending solutions. New in Version 2 is support for LU 6.2 sessions, whereas the original only recognized 3270 data streams.

SNAPS comprises a host-based Decoder and a personal computer-based Guru analyzer.

The Decoder software resides alongside VTAM on the mainframe. It gathers information from VTAM, such as SNA device response times, session path and trace analysis data, and stores it in a mainframe database.

Users can specify how much detail they want from the decoder. For example, the response time monitor in VTAM can provide details on thousands of devices in the enterprise.

The Decoder software passes the VTAM data onto the Guru component, which runs on any DOS or OS/2-based PC attached to the mainframe. Guru also contains its own database to store historical net data.

Guru is an expert system that contains more than 4,000 preprogrammed SNA rules and procedures.

After reading the Decoder data, Guru uses its SNA logic to diagnose and solve SNA software and hardware problems.

Guru presents its findings on the PC screen along with possible solutions and recommendations for further actions.

Without SNAPS, SNA administrators had to manually read through long and complicated VTAM problem traces to find problem sources.

SNAPS can diagnose a problem in hours or minutes, while it took administrators days and weeks, said Catherine Liu, president of the firm.

SNAPS Version 2 will be available this month for $15,000 to $35,000.

✆Applied Expert Systems: (415) 364-1222.

Frontier Software pioneers RMON for the WAN with NETscout analyzer

BY JIM DUFFY

Tewksbury, Mass.

Frontier Software Development, Inc. last week brought out software that lets its local-area network diagnostic equipment monitor traffic on LAN internetwork backbones.

The software runs on Frontier's NETscout LAN probes and on Simple Network Management Protocol consoles that collect data from those devices. It allows users of Hewlett-Packard Co.'s OpenView or SunConnect's SunNet Manager to analyze usage of wide-area links that connect distributed LANs.

Scout's honor roll

Model	Price	Availability
NETscout 6040	$4,995	Sept.
NETscout 6050	$6,995	Oct.
NETscout 9250	$3,495	Sept.
NETscout 9350	$3,495	Sept.
NETscout 9450	$2,995	Sept.

SOURCE: FRONTIER SOFTWARE DEVELOPMENT, INC., TEWKSBURY, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

Previously, NETscout only performed diagnostics on token-ring and Ethernet LAN segments. "Our growth is tied to internetworking growth," said Nathan Kalowski, vice president of OEM marketing and business development at Frontier. "The early adopters of internetworks are now the early implementors of distributed diagnostics."

NETscout supports the Remote Monitoring (RMON) Management Information Base (MIB), which is said to provide more comprehensive fault diagnosis, network planning and performance-tuning capabilities than existing SNMP MIBs and remote monitoring agents. Frontier was one of the first LAN monitor vendors to support RMON (*NW*, Sept. 30, 1991, page 8).

Now Frontier claims that it is the first LAN diagnostic vendor to support RMON-based management of WAN links and LAN internetwork domains and rolled out five software packages to substantiate that claim.

They include the NETscout WAN probe Models 6040 and 6050, and management console software Models 9250, 9350 and 9450.

The 6040 and 6050 packages allow NETscout probes to monitor activity on leased lines running at up to 2M bit/sec, or E-1.

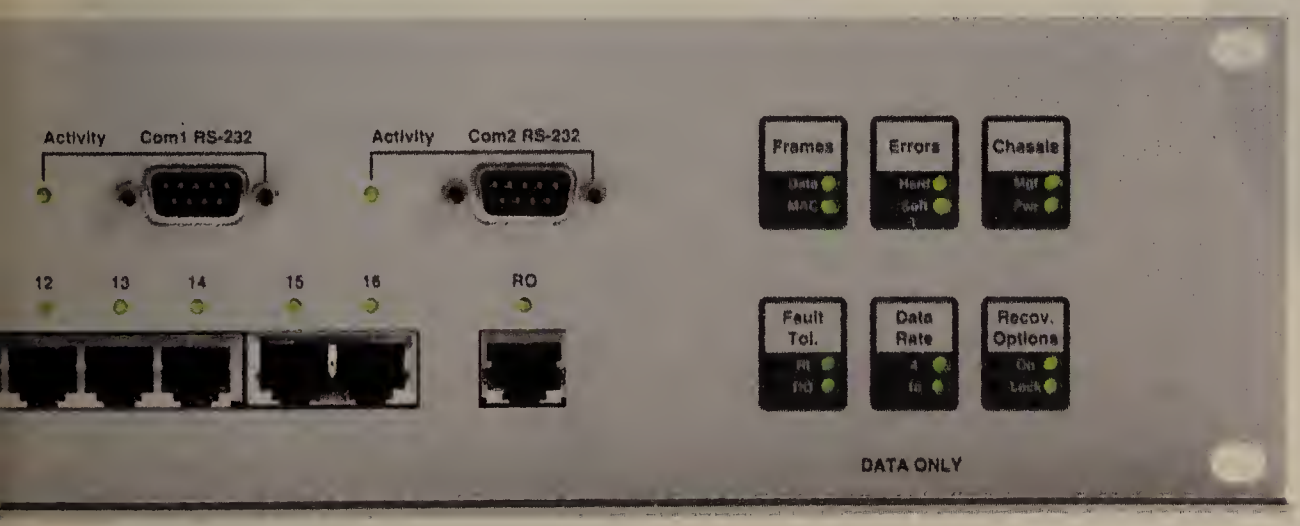
Model 6040 is made for a WAN link that is part of a corporate router net, while the 6050 is designed to monitor a single remote LAN segment and the WAN link connecting that segment to the corporate backbone.

Meanwhile, the 9250, which runs on top of SunNet Manager, and the 9350, which runs on OpenView, collect data from the 6040 and 6050. They allow network managers to print out reports of WAN activity for billing and simulate network transmission costs through what-if scenarios based on user location and particular time zones.

The Model 9450 brings these same functions to a Windows-based management console.

✆Frontier: (508) 851-5700.

ps working. It prevents mistakes.
You do have to plug it in, however.



Link Builder TR

Other hubs alert you to trouble only after it arrives.

When it comes time to expand the network, you'll find that 3Com hubs outpower other Token Ring hubs as well. One network management agent per ring is all it takes to manage 260 people on the network.

And 3Com's RISC-based performance lets you take full advantage of another unique benefit: fully implemented RMON.

This remote monitoring capability is built into every 3Com Token Ring hub, giving you a "network analyzer in a hub." And saving you thousands of dollars.

But why not see for yourself? Simply call **1-800-633-HUBS**. Or visit your authorized 3Com reseller and ask how you can plug into the most advanced Token Ring hub technology around.

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Star-Tek
Networks That Go the Distance™

VISIT US AT INTEROP BOOTH #4048

Another reason why we're one of the world's most popular dishes.

Introducing SkyRelay, the first VSAT to serve up internetworking.

If applying VSAT's inherent flexibility and reliability to your LAN client/server environment is your cup of tea, then there's only one dish for you:

SkyRelay from Scientific-Atlanta.

SkyRelay—with its flexible LAN support, frame-relay backbone, and bandwidth optimization package—was designed specifically for companies migrating toward distributed computing environments and requiring higher-capacity communications support.

SkyRelay's unique recipe for supporting high-capacity VSAT communications includes the first and only VSAT LAN Brouter, which supports both Ethernet and Token Ring LANs and comes custom-configured to your interface requirements. SkyRelay's frame-relay backbone protocol also gives you greater efficiency by eliminating unnecessary network overhead.

Interesting ingredients include bandwidth-on-demand, plus other key optimization features that ensure satellite bandwidth during peak periods and tailor the system's bandwidth to your traffic demands. SkyRelay's new hub design is scalable, too, so it can grow with your network. And it's all supported by a network operations system that provides the kind of comprehensive functionality you'd expect to find in a Network Operations Center.

Hungry for more details? Call Scientific-Atlanta at **1-800-945-VSAT** for our free SkyRelay Fact Kit. And think of us whenever and wherever you dine under the stars.

Scientific Atlanta

BRIEFS

Cabletron Systems, Inc. this week will unveil Version 2.0 of its Spectrum net management system. New bundled applications for the system include Data Export, which lets users export management data from Spectrum's database to an ASCII delimited file; Report Generator, which uses a new Motif-based interface to provide customized reports; and Command Line Interface, which provides command- and script-based access to information in the database.

Spectrum 2.0 costs $15,000 and is available now.

Cabletron will also announce this week Spectrum for Open Systems, a suite of Spectrum applications that allows the company's products to be controlled from major management platforms, including Hewlett-Packard Co.'s OpenView for Unix, IBM's NetView/6000, SunConnect's SunNet Manager and Novell, Inc.'s NetWare Management System.

Cabletron: (603) 332-9400.

Chipcom Corp. last week announced that its ONdemand Network Control System (NCS) net management software will support both Hewlett-Packard Co.'s OpenView and Digital Equipment Corp.'s Polycenter. Chipcom also became an official member of both companies' partners programs. Previously, NCS had only supported SunConnect's SunNet Manager and IBM's NetView/6000.

Chipcom: (508) 460-8900.

Racal-Datacom, Inc. last week rolled out the 10BT-MGR, a 10Base-T Ethernet module for the company's INX 5000 intelligent wiring hub that features an on-board Simple Network Management Protocol agent.

The module eliminates the need for a separate net management module and frees up chassis slots.

The module, which is hot-swappable, comes in three versions: a 12-port module with RJ-45 connectors, a 12-port model with a 50-pin telephone company-style connector and a 24-port version with two 50-pin connectors. The 12-port modules cost $2,095 each, while the 24-port model costs $3,195. All are available now.

Racal-Datacom: (800) 722-2555.

LANart Corp. last week made a big Ethernet splash when it rolled out 15 low-end connectivity products, including managed and unmanaged hubs, repeaters and transceivers.

Topping the list is a suite of unmanaged hubs, including an eight-port 10Base-FL hub that is priced at $220 per port. LANart also added 12- and 16-port models to both its managed and unmanaged 10Base-T lines. A two-port repeater and additions to its LinkAlert transceiver family rounded out the offerings.

For pricing and availability, contact LANart.

LANart: (617) 444-1994.

SynOptics exec details strategy for net future

Maps migration to new high-speed technologies.

Q&A

The network industry is entering a phase of dramatic change as emerging high-speed communications technologies jockey for position and a chunk of users' budgets. While Asynchronous Transfer Mode (ATM) is viewed by many as the ultimate answer, users must carefully choose a migration path today, making sure to protect their installed base as they move into the future.

Hub vendors also face some tough choices regarding which new technologies to embrace and when. Ron Schmidt, vice president and chief technical officer at SynOptics Communications, Inc., spoke recently with *Network World* Senior Writer Skip MacAskill about the hub maker's strategy in these changing times.

There's a move in the hub industry from shared-media devices to those based on switching architectures. What's driving that?

Users are demanding more bandwidth because [they have] more powerful desktop devices and bandwidth-hungry applications that run on top of them.

The challenge is how you deliver this bandwidth at the right cost point.

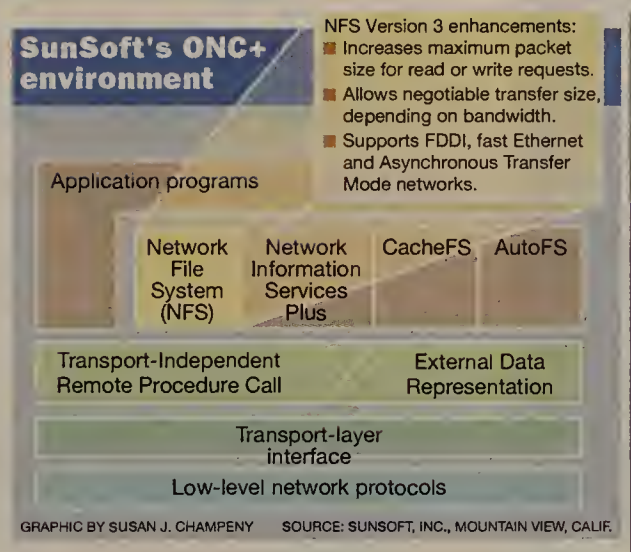
Three years ago, we concluded that you had to do it with switching. You don't want to have the electronics in the computer working at the aggregate data rate. You want to have it work at the data rate the computer is really going to be able to digest.

By putting the high aggregate data rate in the switching vehicle, which is all silicon and parallel electronics, you get a very low cost point.

Switching technologies such as ATM are still expensive. Can't users meet high-speed needs now with standardized technologies such as Fiber Distributed Data Interface?

If you compare 100M bit/sec ATM with 100M bit/sec FDDI and you look at the fun-

See SynOptics, *page 24*



GRAPHIC BY SUSAN J. CHAMPENY SOURCE: SUNSOFT, INC., MOUNTAIN VIEW, CALIF.

SunSoft launches Network File System Version 3

BY CHRISTINE BURNS

Mountain View, Calif.

SunSoft, Inc., the systems software unit of Sun Microsystems, Inc., has released a new version of its Network File System (NFS) protocol that will let users in a multivendor environment access remote files more quickly.

NFS is the protocol supported in SunSoft's distributed computing offering, ONC+, which enables users to access files anywhere on a network as though they were stored on a local file server.

ONC+ implementations that take advantage of NFS Version 3 will be generally available some time next year.

The enhanced NFS version will also be implemented by other vendors supporting the technology. NFS Version 3, which is available now, is based on requirements for an open file system protocol set by a group of manufacturers, which includes Cray Research, Inc., Data General Corp., Digital Equipment Corp., Hewlett-Packard Co. and IBM. SunSoft licenses the NFS protocol specifications to these companies for use in their distributed computing environ-

See SunSoft, *page 21*

WORK GROUP HUBS

ODS to introduce hubs with switching, routing

BY SKIP MACASKILL

Dallas

Optical Data Systems, Inc. (ODS) this week will introduce two work group hubs that offer Ethernet and token-ring configuration switching features as well as integrated routing support.

The new MicroHubs, which come in Ethernet and token-ring versions and will debut at the INTEROP 93 Fall trade show in San Francisco, are actually smaller versions of ODS' flagship Infinity intelligent hub, according to Terry Gaston, vice president of marketing at ODS.

"The remote access market has been undergoing incredible growth lately, so we wanted to develop a product that offered features of chassis-based hubs but at a price that was competitive with stackable and work group hubs," he said.

The MicroHub base unit comes equipped with either 12 ports of 10Base-T Ethernet or 16 ports of 4M or 16M bit/sec token ring. Users can then add as many as six 12-port Ethernet or 16-port token-ring modules to the basic configuration to support as many as 84 and 112 users, respectively.

The Ethernet MicroHub, which has a backplane capacity of 10M bit/sec, can be segmented into as many as seven independent Ethernet local-area networks. The hub also offers work group-level switching, meaning any 12-port module can be switched from one Ethernet segment to another.

The token-ring version features port-level switching, meaning any port on any module can be switched between the two token-ring backplanes supported by the hub. The hub comes standard with a copper-based ring-in/ring-out port, with an optional fiber-optic version also available.

ODS announced that it will integrate either Cisco Systems, Inc.'s 3000 or Wellfleet Communications, Inc.'s Advanced Feeder Node routers in the MicroHubs, allowing branch office and remote LANs to connect to corporate resources and users at a central location across the wide area.

The hub also supports the Simple Network Management Protocol, as well as all nine Ethernet and 10 token-ring groups of the Remote Monitoring (RMON) Management Information Base. RMON provides the user with statistics gathering and diagnostic capabilities.

The token-ring MicroHub also offers ODS' Network Protector capability, which automatically detects beaconing errors and prevents faulty nodes from gaining entry to a ring, reducing network downtime.

The Ethernet MicroHub prices start at $2,000, while the token-ring version begins at $2,800. The integrated router versions start at $6,295 and $7,495, respectively.

Both hubs will be available in 60 days.

ODS: (214) 234-6400.

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You Need More Aspirin.

Hard To Believe. Just last week you were celebrating your promotion. Well, the party's over. You suddenly realize you got more responsibility but no more authority. They want you to fix everything and nothing at the same time. How can management expect you to get your job done when it takes them two weeks to make a decision?

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Look! Being flexible isn't part of your boss's job description. So you need a telecommunications system that makes it easy for you to be flexible. ESSX® service from South Central Bell. It's the central office-based switching service that lets you control your own adds, moves and changes to station lines. It can even expand the capabilities of your existing PBX, making it a more powerful tool for connecting separate offices.

If you need switched digital data transmissions of up to 56 Kbps, ESSX service can handle that for you, too. Using features like Station Message Detail Recording or SMDR, you can track calls made from each phone in the system. So it's easier to control phone costs by department.

These are just a few ways ESSX service can make it easier for you to get the job done. Call South Central Bell at 1 800 522-BELL for more information. Working together, we'll solve the unique communications challenges that your business faces. And that's something that can make you–and your boss–very happy.

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A BELLSOUTH COMPANY

NCR expands its NetWare connectivity product line

BY CARYN GILLOOLY

Dayton, Ohio

NCR Corp. last week expanded its NetWare connectivity horizons with the release of new versions of its StarGroup NetWare/X and StarGroup Server for NetWare Clients (SSNC).

StarGroup NetWare/X is NCR's implementation of Novell, Inc.'s NetWare for Unix that runs on NCR's System 3000 hardware platform. StarGroup NetWare/X offers users the same file and print capabilities as Novell's NetWare for Unix, as well as access to all other NetWare services.

StarGroup NetWare/X 1.7 builds on NCR's previous version by offering multiprocessing capabilities, enabling users to run the software on multiprocessor versions of the System 3000. Previously, the software could only run on the uniprocessor versions of the System 3000 line.

"This is good for customers [who are] looking to add a database or application server and need a Unix machine with symmetric multiprocessing," said Nancy Trachtenbarg, senior product manager for NCR, based here.

Chemical Bank is currently using StarGroup NetWare/X on NCR System 3000 uniprocessor machines at 385 of its branch locations.

"StarGroup NetWare/X allowed us to implement our networking strategies while leveraging our Unix servers," said Michael Papantoniou, vice president at Chemical Bank in New York.

Papantoniou did not say whether the company plans to upgrade to the new version of StarGroup NetWare/X.

BUILDING ON SSNC

SSNC 1.01 can also now reside on NCR's multiprocessing machines. The software provides connectivity between NCR's version of Microsoft Corp. LAN Manager and NetWare environments. It resides on the server in a StarGroup LAN Manager local-area network, letting NetWare users log on to the LAN Manager server as if it were a NetWare server and providing access to all files and applications on that server.

In addition to multiprocessing capabilities, Version 1.01 supports token-ring networks. Previously, only Ethernet was supported. Also, Version 1.01 lets NetWare clients share directories, files and printers with Apple Computer, Inc. Macintosh clients attached to the LAN Manager server, although the server must also be running NCR's StarGroup Server for Macintosh Clients software.

NCR StarGroup NetWare/X is available now with a starting price of $1,595 for five users on a uniprocessor system and increasing to $17,495 for 250 users on a multiprocessor system.

SSNC will be available later this month and will be priced at $1,895.

✆NCR: (513) 445-5000.

SunSoft

Continued from page 19

ments.

To help speed file access, NFS Version 3 provides the capability to transfer large packets over high-bandwidth Fiber Distributed Data Interface, 100M bit/sec fast Ethernet and Asynchronous Transfer Mode (ATM) networks.

FASTER FILE ACCESS

Version 3 increases the maximum packet size that can be sent over the network when a client makes a read or write request to the file server.

Previous versions of NFS capped the size of data packets at 8K bytes for files sent over 10M bit/sec Ethernet networks.

But NFS Version 3 allows the packet size to be larger than 8K bytes. The maximum packet size will be determined by the amount of available bandwidth on the FDDI, fast Ethernet and ATM networks.

Data transmission rates on 10M bit/sec Ethernets will remain capped at 8K bytes.

"The 8K-byte limit is a performance hindrance when you get into things like fast Ethernet and ATM," said Chuck McMannus, senior technologist at Sunsoft's network technology group.

NFS Version 3 lets the server and the client negotiate the optimum packet size for the network connection, he added.

Another performance enhancement in Version 3 is its support for asynchronous writes to a server, which should reduce delays for users while an NFS server is writing data to a disk, McMannus said.

Synchronous writes to the server in past versions ensured consistency of data but exacted a performance toll.

✆SunSoft: (800) 227-9227.

"NetACCESS is a good way to test unfamiliar waters."

"NetACCESS is a very good service. It can save you a lot of shopping around for new technologies."

"NetACCESS supplies so much incredible information. I just love it."

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FEATURED THIS WEEK ON NETACCESS

new product additions in blue

For the cost of the phone call, sample all of the demos NetACCESS offers. To reach the BBS at 300 to 2400 bps (8N1), dial (508) 620-1160. Call (508) 620-1178, for speeds up to 9.6K bps. Or for information on how to get your products on NetACCESS, call Debra Mahler at (508) 820-7477.

ADC TELECOMMUNICATIONS
PatchSwitch Demo
ADC's automated control for remote tech control switching systems. Includes circuit configuration records and switching alarm history on all connections.

COMMUNICATIONS DEVICES
Network Windows Demo
Requires a MS-DOS PC with 640k and color monitor.

COMPAQ
Product Line Demo

COOPER AND ASSOCIATES
Teletutor Demo
Demonstration on Frame Relay applications and technology. Fixed disk and VGA required.

DCA
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2. cc:Mail for windows — Requires Windows.

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MICRODYNE
OnLAN/PC Demo
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IBM

Making networks work.

SynOptics

Continued from page 19

damentals, we're pretty convinced that the cost of FDDI and ATM is about the same. With ATM's switching architecture, the aggregate data rate is the number of ports on the switch times the data rate of a port. Our ATM switch's aggregate data rate is 2.4G bit/sec, while our FDDI hub's rate is only 100M bit/sec because it's a shared-media access device. As you start pushing the performance curve out there, all the economics and the technology drive you to switching.

Doesn't that shortchange the FDDI products that SynOptics is currently offering?

That's true, but I'm talking about the beginning of a transition that is comparable to the transition that occurred in the early 1980s. It took something like seven years for Ethernet to get widely deployed, and I'd say it's only been in the last couple of years that it's been viewed as a real network mechanism for corporations. There are leading-edge users who will adopt the new technologies and play with them, but that is not the broad market.

Will it take ATM just as long to become widely accepted?

I think so. Look at what has to happen. The technology is still immature in the sense that all the components are not there. The ones that are here have not been used widely enough to validate them for users [looking] to base their whole corporate infrastructure on them. The applications that really make use of ATM are not there, either. We're very, very early in the ATM movement, and there's still a lot of work to do.

"There are users who can deploy [ATM] now because they require that type of performance, but we're talking lunatic fringe."

We're probably a year away from having enough products in the market so that users can start deploying the technology instead of playing with it. There are users who can deploy it now because they require that type of performance, but we're talking lunatic fringe.

Has ATM been overhyped?

During the past year, ATM has been dramatically overpromoted — by the vendors, certainly, by the media, probably.

The reality of where ATM is and the timetables for its rollout have finally been set, but it's taken a year of churn to reach that point.

Besides ATM, SynOptics is investing in a number of emerging high-speed technologies, including fast Ethernet, switched Ethernet and FDDI over copper. How does a user make sense of all these choices?

That's a tough question. The question I've been posing to myself is, How does a vendor decide what to do? We know there are emerging requirements for higher speed methods [to resolve] bottlenecks at servers and [support] applications that are bandwidth-intensive. But users have to see the value in an application before they buy the new technology.

Take switched Ethernet. We see it as distinctly different from ATM in the sense that switched Ethernet is a performance upgrade for the installed base. It is an incremental step to give you more performance and maintain your existing net. The person who has a bottleneck problem on the server or is trying to do real-time transactional computations can easily upgrade performance without having to think about new LAN architectures and protocols.

If users with those bottleneck-type problems are making pragmatic decisions, Ethernet switching and other frame switching technologies will undoubtedly be on their short list.

How does fast Ethernet play in this picture? There has been criticism that it is more marketing hype than anything else.

Fast Ethernet, as defined in the 802.3 standard, is a low-cost FDDI alternative. We want to build on fast Ethernet specifications to implement switched systems. If someone wants a shared-media 100M bit/sec Ethernet, we'll be interested in that, too.

The strategic thrust for users involves [making] Ethernet scalable. Our thrust is to give users a migration path that protects their installed base of hubs, adapters and station software as their networking needs grow.

When you tie this into the ATM fabric, which we are doing, then we also give you an architecture for a more powerful system that is adapted to wide-area communications.

Will you be tying ATM to the traditional local-area networks through your next-generation hub?

Yes and no. We're really trying to take a systems perspective on what we will be delivering in the future, so tying in ATM to legacy LANs involves more than our next-generation hub.

There are key functions we have to deliver within a systems context that protect the installed base, allowing one to incrementally upgrade and providing the platform for future development.

The challenge in the hub business now is not so much in the hot box but in being able to deliver a system constructed of interrelated boxes that allows the user to upgrade to the performance level they want incrementally and build on the installed base.

It's important to provide links between the current access methods, our new switching methods for Ethernet and the future promised by ATM. Science is finding a way to do this in a cost-effective way while still providing the architectural underpinnings to do things that will have a long life.

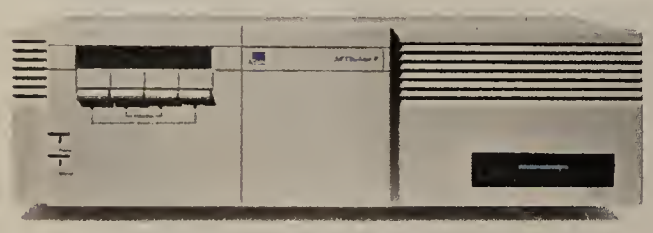
We want to create the concept of virtual networks so we can take our installed base, our new technology and our future technologies and build a real coherent system.

Will branching out into more of a systems focus hurt your standing as one of the primary hub companies?

I don't think so. In fact, I think it is necessary in order to be a competitive company in the future. We believe there is an architectural con-

We came. We s

Of course, we're not normally ones to boast, but in this case, it's too hard to resist. Recently, *Communications Week* tested several internetworking devices in multi-protocol environments. 3Com's NETBuilder II® earned a perfect score in every single test scenario. The first perfect overall score recorded. Anything they could dish out, this router could take.



Surprised? We weren't. After all, NETBuilder II was designed to be the most powerful, flexible router made.

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And so flexible, it can support Novell's IPX, AppleTalk, IBM

First Perfect Over

Cisco device takes a licking, but
3Com bridge-router keeps on tickin

By EDWIN E. MIER
AND CHRIS GIULIANO

When bridge-routers from Cisco Systems Inc. and 3Com Corp. were evaluated for this installment of *Communications Week*'s mixed-LAN test program, it was 3Com's NetBuilder II that carried home the awards.

In fact, the NetBuilder II is the only bridge-router among the six tested to date in our series to command a perfect score for all test scenarios.

The NetBuilder II successfully handled the worst traffic scenarios we could throw at it, without skipping a bit.

That performance, coupled with a price tag that is considerably lower than many other market leaders', m
3Com's bridge-router an
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our labs, despite the
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vergence of the first three layers of the ISO model currently under way. ATM is one manifestation of this, and don't forget that ATM is a routing technology as well as a connectivity technology. That's not to say that hubs — or routers, for that matter — as they are currently defined aren't going to exist in the future, but there are new ways of doing things that will cause these things to converge.

Look at the trends in the hub market. The number of stations within a broadcast domain is getting smaller because Ethernet and token-ring users are trying to up the performance on their nets. They're using routing to interconnect those segments, act as security barriers and increase performance. Switching or ATM can provide all those functions except the internetworking.

Because switching is starting to play those roles, it's starting to reposition the connectivity and routing technology quite dramatically.

In light of that, will SynOptics develop its own routing technology to complement its switching and ATM capabilities?

We have to get routing within our system in a coherent way so we can add value. We have to take control of that destiny.

What will SynOptics' next-generation hub look like architecturally?

This new hub has taught me that there are barriers to entry in the hub business, contrary to what a lot of market and financial analysts have said. The hub we're working on has to be targeted at specific applications that we see emerging, as well as have the attributes [that are] key to a long and healthy life in the period of turbulence we're entering in the marketplace.

What applications are you referring to?

We've been looking at the way people wire their network and the way they control and manage it, but we don't have our act completely together yet to really talk about it.

There has been a lot of speculation about what SynOptics will do with the $220 million war chest it is sitting on, including a possible acquisition. What is SynOptics planning to do with the money?

As you said, it's a war chest. One of SynOptics' strong points is that we do not have a not-invented-here attitude. We are willing and capable to assimilate other people's work into our products and build on them. If an acquisition comes up that will help our long-term positioning and get us ready for the future, the money is there to make it happen.

"Switches are the ultimate fascists and will do a lot to improve net simplicity and help the cost structure."

Is the idea that the people you typically would partner with, such as Cisco Systems, Inc., will be potential competitors as you move toward ATM?

Because the routing and connectivity are coming together, there has to be a realignment of the industry, and companies such as Cisco are, in fact, potential competitors in an architectural sense, if no other way.

Are your average users really looking at these high-speed technologies or are they still mainly concerned with improving their Ethernets and token rings?

There are two basic user profiles. Some have realized that their future productivity rests on LANs and the implementation of LANs that can support the infrastructure of their business. These people typically have intelligent, savvy network administrators who see the writing on the wall and are trying to understand where the future is. They also help us understand that future.

Another group tends to be driven by everyday problems. They have an application they have to get up, a performance problem they have to handle or something isn't working right. They tend to be more pragmatic and short-term in their thinking.

Is there anything that appeals to both groups?

Ethernet switching will have dramatic appeal to both groups because of the simplicity associated with it and the long-term capability it has in interacting with newer technologies. Part of our strategy is to take the Ethernet switching and make it work with ATM switching in a way that is seamless.

Do mainframes and host-based systems eventually disappear as ATM becomes more prevalent or do we drag them along with us into the future?

I can't imagine they'll disappear because the investment in them is so great. They will have a long life. Users that have made heavy investments in SNA will invest in technologies that give them the flexibility to migrate to a new way of doing things, however. The key to keeping them happy is providing solutions that give them a migration path and not cause forklift upgrades.

I've been trying to understand how the SNA world will make the transition to ATM and don't really have an answer. At some level of abstraction, ATM is connection-oriented and SNA is connection-oriented, so you have to think they work together nicely. But that's almost trite. The whole question is the migration capability. Like anything that is SNA-oriented, IBM really has to take the leadership position.

What about the management of these new environments that will be full of converging new and old technologies?

Users want simplicity and easier systems to run, and those things are associated with management. The more you can automate, simplify and reduce the skill levels required to maintain the net, the better. We've really been pushing switching from the performance point of view, but making the net easier to manage is also a key attribute that switching offers. The PBX net in a firm is probably managed by one guy, while the LAN side has at least 10 administrators.

Switching gives you more authority over the net than shared-media access LANs. Switches are the ultimate fascists and will do a lot to improve net simplicity and help the cost structure. But that's the long-term view. We need to concentrate on the performance gains before we can reach a better understanding of how the technology works, which will let us exploit the inherent management functionality.

aw. We routed.

ll Score Earned

3COM'S PERFORMANCE IN A MIXED-LAN ENVIRONMENT

Traffic streams from an Ethernet and a token-ring LAN were sent to a 3Com NetBuilder II bridge-router simultaneously. To reflect real-world conditions, packet sizes and the number of nodes on both LANs were varied. The traffic load was increased in 10 percent increments, up to the maximum that can be exchanged between the LANs in each scenario. The figures in the grids represent (as percentages of the maximum possible) the levels at which the device processed bidirectional traffic before it began to drop packets. Results are given for each routed protocol tested and for transparent bridging.

AppleTalk

No. of nodes	Packet size in bytes				
	Ethernet to token-ring				
Ethernet/token-ring	64	128	512	128	64
100/1	100%	100%	100%	100%	100%
50/50	100%	100%	100%	100%	100%
1/100	100%	100%	100%	100%	100%
100/100	100%	100%	100%	100%	100%
	512	512	128	128	64
	Token-ring to Ethernet				

DECnet

No. of nodes	Packet size in bytes				
	Ethernet to token-ring				
Ethernet/token-ring	64	512	1,500	128	64
100/1	100%	100%	100%	100%	100%
50/50	100%	100%	100%	100%	100%
1/100	100%	100%	100%	100%	100%
100/100	100%	100%	100%	100%	100%
	1,500	512	64	128	64
	Token-ring to Ethernet				

	Packet size in bytes
	Ethernet to token-ring

NetBIOS/NetBEUI, Banyan VINES, DECnet, XNS, OSI, and TCP/IP protocols. Not to mention any LAN or WAN media, including FDDI and other high-speed media that come along.

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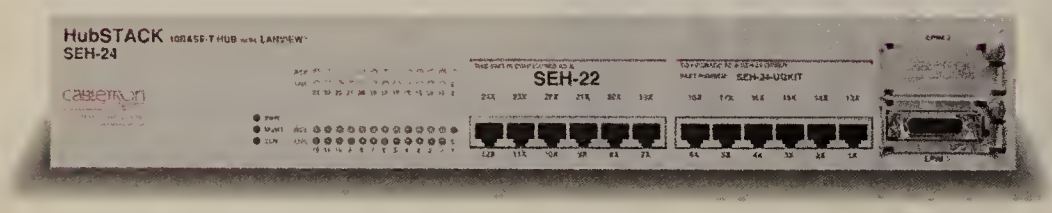

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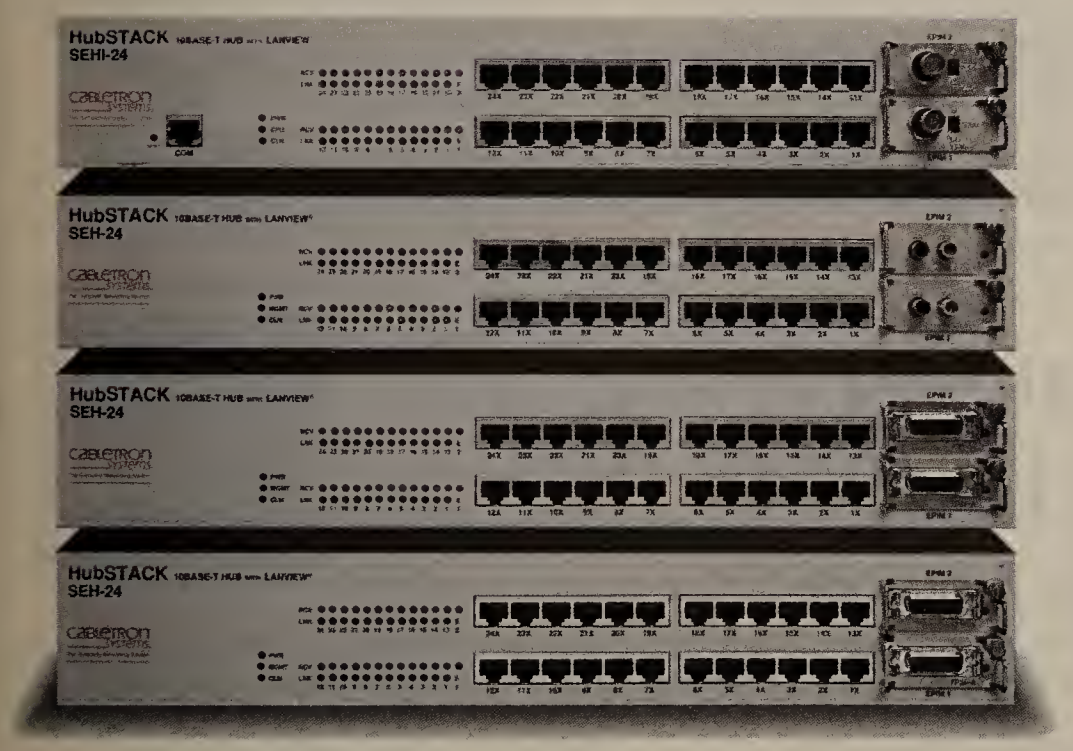

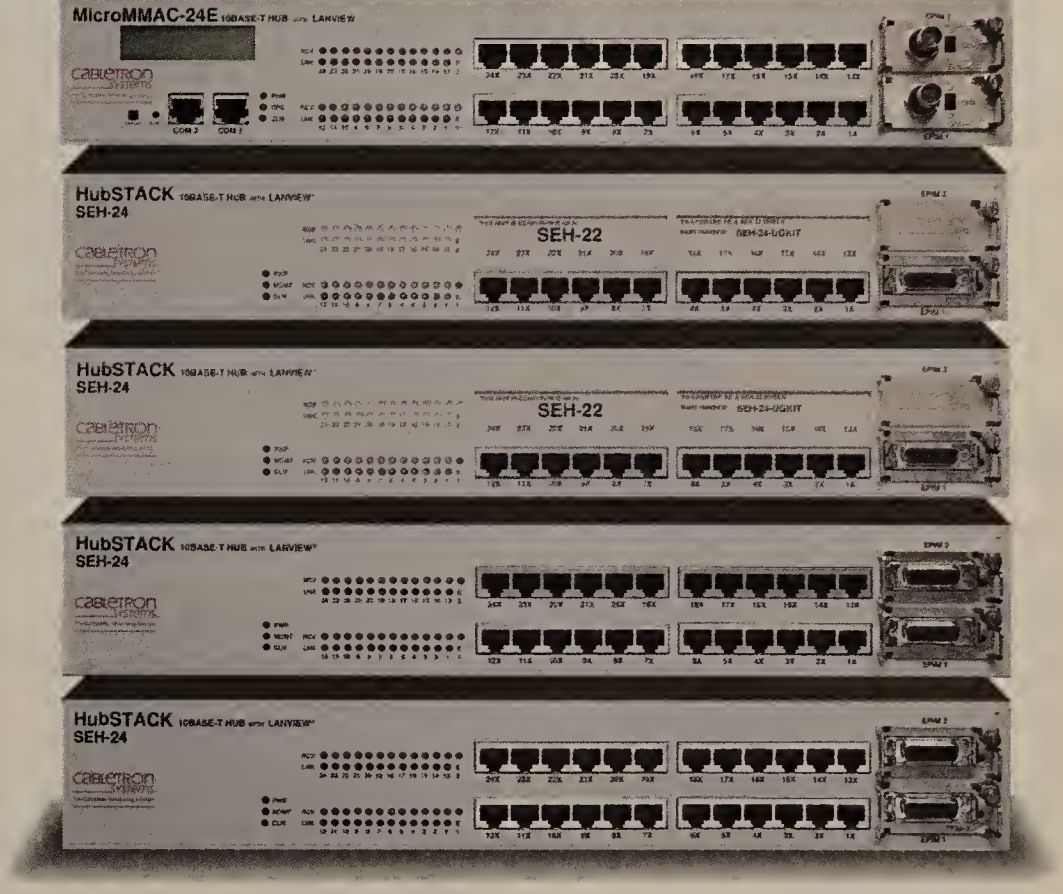

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WilTel readying international push

Waiting for regulatory approval.

BY BOB WALLACE

Tulsa, Okla.

WilTel last week said it has requested regulatory approval to begin reselling international private-line capacity, a move that paves the way for the carrier to begin offering global net services.

In anticipation of Federal Communications Commission approval allowing the company to compete with the Big Three and other carriers in this crowded market, WilTel announced the creation of a new business unit to develop its international private-line services strategy.

The new WilTel International business unit, based here, will draw upon the resources of as many WilTel departments as needed, said John Barnett, vice president of the unit. He would not say how much money WilTel will pour into WilTel International.

LINKING THE WORLD

Although WilTel International has not yet finalized its strategy, Barnett outlined the new unit's short-term objectives.

"Our initial focus is to provide our data [services] in England and [continental] Europe, followed shortly by deployment in selected Asian markets," Barnett said. "[WilTel International] will broaden [WilTel's] service offerings, especially to its domestic customer base, by providing international connectivity."

He would not say which of WilTel's data services, ranging from public frame relay to T-3, will initially be extended outside the continental U.S., nor would he give time frames for when the services will be available.

Currently, when WilTel customers ask the carrier for global links, WilTel works with existing international carriers to provide the needed connections and passes along the cost of these efforts to the user. This practice will end once the new unit commences operations.

Barnett said WilTel "will continue to evaluate its options for both tactical and strategic partnering," an approach common to

See **WilTel**, *page 32*

Fiber cables proliferate

Total international fiber cables on-line as of year-end 1992:

Region	Number
Atlantic	11
Pacific	5
Caribbean	5

Additional fiber cables planned for 1993-1998:

Region	Number	Number on-line by year end
Atlantic	15	2
Pacific	13	6
Caribbean	14	1

SOURCE: KESSLER MARKETING INTELLIGENCE CORP., NEWPORT, R.I.

BRIEFS

Sprint Corp. and modem manufacturer **PSI Integration, Inc.** have teamed up to offer a facsimile broadcast service. Using a Macintosh and PSI modem, users can deliver a fax and a distribution list to Sprint and have the fax broadcast to thousands of destinations. No setup or monthly fees apply; Sprint only charges for connection time.

PSI will release its FAXcilitate 1.5 communications software with fax broadcast next month.

The **Federal Communications Commission** has turned down a **Bell Communications Research** request to begin assigning personal communications service numbers Aug. 1. Bellcore had said carrier need for the 500 access codes is urgent, but the commission decided to get industry comment before assignments begin. Issues to be covered include the fairest way to assign numbers, how to avoid quickly exhausting the supply and ensuring 500-number portability. Comments are due Sept. 3, with replies due by Sept. 23.

LCI International last week announced that Zilog, Inc. has awarded it a two-year, $1.7 million contract for a variety of the carrier's voice and data network services. Zilog will implement LCI's international 800, fractional T-1, WorldCard calling card and virtual network services to link its offices and plants around the world.

AT&T has signed a service contract with the Federal Reserve Bank of Chicago to link 12 Federal Reserve banks via a nationwide data network.

The FEDNET system will link banks in Atlanta, Boston, Chicago, Cleveland, Dallas, Kansas City, Mo., Minneapolis, New York, Philadelphia, Richmond, Va., St. Louis and San Francisco. The system's DS1 and DS3 circuits will run over diverse routes to guard against outages.

ATM

Australians to set up ATM net in 1994

BY BILL BURCH

Melbourne, Australia

Telstra Corp., Ltd., Australia's leading telephone company, plans to have one of the world's first national ATM networks operational by the fourth quarter of next year.

"We'll do something relatively small-scale for the first year or two," said Dennis Dorman, Telstra's manager of network technology strategy. If things look good at the end of the initial trial, Telstra will proceed with a commercial Asynchronous Transfer Mode service.

Telstra is rolling out the network in two phases. During the first phase, which will last for the next two years, the company will install one ATM switch each in Brisbane, Canberra, Melbourne and Sydney, Australia. After a project review and a funding decision, the ATM project's second phase will begin. Additional capacity will be added to switches in Melbourne and Sydney that will function as backbone nodes. Brisbane and Canberra will become access nodes, and a third access node will be added in Adelaide.

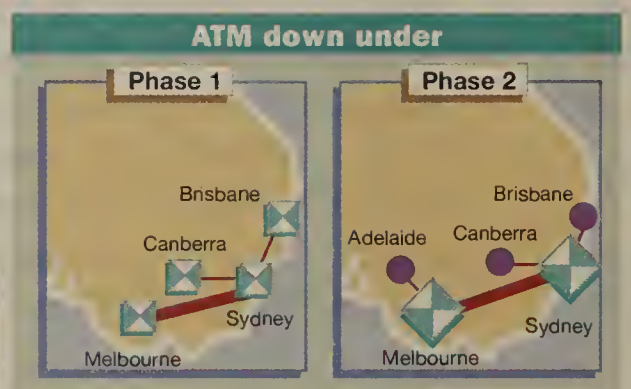
At the network's physical level, Telstra will connect Melbourne and Sydney at 155M bit/sec over a fiber link running the Synchronous Digital Hierarchy (SDH) protocol, an international version of the Synchronous Optical Network standard for fiber-optic transmission. Other network links will run at 34M bit/sec and adhere to the Plesiochronous Digital Hierarchy (PDH) protocol, another international standard for fiber transmission.

The highest usable speeds on the network will be 130M bit/sec for SDH and 30M bit/sec for PDH, Dorman estimated.

Telstra will buy all four of the Phase 1

See **Australia**, *page 32*

ATM down under



The Australian phone company Telstra plans to have an Asynchronous Transfer Mode (ATM) network operational by the fourth quarter of next year. An early trial network will feature ATM switches in Bnsbane, Canberra, Melbourne and Sydney. Telstra's full commercial network will include Adelaide, as well.

GRAPHIC BY TERRI MITCHELL SOURCE: TELSTRA CORP., LTD., MELBOURNE, AUSTRALIA

AT&T details new apps for voice systems

BY BOB WALLACE

Bridgewater, N.J.

AT&T last week detailed three new applications for its Conversant Voice Information System that give users new options for dealing with peak calling periods.

The new Conversant Call Center Applications enable the voice processing system to play recorded announcements, take voice messages and provide customized call routing.

The applications work with AT&T's Definity Generic 3 line of digital private branch exchanges running Version 2 switch operating software. The packages support capabilities that were previously available only with custom software.

With the Conversant Announcements package, the voice processing system can play standard and customized recordings created by the user. For example, a caller waiting to place an order could listen to product information while waiting for an agent.

While listening to a recording, callers keep their spot in line to be fielded by the next available agent.

Mark Jackson, marketing manager of call center solutions at AT&T, stressed that while listening to the recording, callers retain their spot in line to have their calls fielded by the next available agent.

The second program, Conversant CallBack Messaging, allows callers to leave a voice message after hearing an announcement stating there will be a delay in answering the call. The system then plays back the messages to agents as they become available.

The Conversant Custom Routing application uses automatic number identification (ANI) and dialed number identification service (DNIS) data to route calls to specific agents or groups of agents. If ANI or DNIS is not available, the callers can be prompted to key in their telephone number.

"You could have a scenario where your callers have silver, gold or platinum charge cards and need varying levels of attention," Jackson said. "It'd make the most sense to have those callers sent to the appropriate agent group."

In order to use any of the new applications, the call center manager configures the Generic 3 with a set of call processing scenarios that are invoked when all call agents are busy. All of the new applications support a feature whereby, when all agents are busy, the Conversant system informs callers approximately how long it will be before their call can be fielded by an agent. The estimate is based on the number of agents in the call center, the average call processing time and the caller's position in the queue. AT&T is offering users start-up assistance with each package.

Firms can contract for the level of support they need, including on-site training, system programming and technical consultation. The Conversant Call Center Applications will be available in October. AT&T will lease the complete set of applications for roughly $1,500 per month.

✆AT&T: (800) 325-7466.

by Eric Schmall

Confidentiality is a must for today's telecom manager

Did you realize when you first entered this field what part confidentiality would play in your job? You would expect to encounter sensitive issues if you work in the human resources area, dealing with people's pay records, work problems and the like. You could also anticipate dealing with secrecy if you have responsibility for strategic planning or product development. But the *telecom department*? What's to conceal?

The answer is change. Strategic moves, sudden firings, organizational shake-ups and the proposed buyout of another firm all need telecommunications support before there is any official acknowledgment.

Since it resides in the center of your organization's voice and data webs, your department will become privy to all sorts of organizational changes in their planning stages.

For example, long before there is any explicit communication about a shake-up on executive row, your voice technicians may receive confidential calls from the personnel director advising them to remove an executive's extension and close out his voice mailbox as soon as possible.

This knowledge, while necessary for you to plan the needed telecommunications changes, carries with it a heavy responsibility.

You have to use a great deal of discretion when giving instructions to the wiring technicians, programmers and outside vendors. Oftentimes, you will have to work through encumbrances such as floor plan confidentiality until management can inform individuals of their new status — or lack thereof — within the organization.

It is difficult enough ensuring that network components are moved to the right positions on time and in good working order. Now you also have to plan cautiously, sometimes under rigid orders *not* to talk to any users.

Even more sensitive are the meetings you and selected staff members attend that focus on potential mergers, acquisitions and divestitures. Because voice and data interconnections are becoming recognized as key components in the swift execution of these strategic moves, you'll become deeply involved in closed-door conversations about these issues.

You may be required to sign a document binding you to keep silent regarding the feasibility studies of acquiring another company. You will also be advised of penalties regarding disclosure of such information or warning you away from investment activities that could lead to your prosecution under federal law regarding "insider trading."

This is heady stuff since you originally got into this field because you enjoyed playing with tip and ring. The point is, however, that you have to set the standard for the telecommunications group in discussing this particular dimension of the job.

To achieve this, you will need to outline your expectations regarding confidentiality.

You should establish a policy that alerts your staff to the nature of the privileged information they are likely to hear long before anyone else.

You should outline the kinds of information that are most sensitive and establish rules about how your people are to treat it.

For example, you might consider reports involving personal removals, relocations or status changes to be among the highly confidential subjects discussed only in private meetings within the department.

Whatever guidelines you establish, your main goal is to prevent your staff from gossiping with others about the "big changes" soon to sweep through a division. This only serves to frighten and confuse the user community.

In fact, revealing such information before management is ready to disclose it will destroy the professional trust vitally needed in the telecommunications department.

In World War II, the slogan "Loose lips sink ships" warned against discussing workplace news. In this profession, loose lips can sink your credibility as well as your career.

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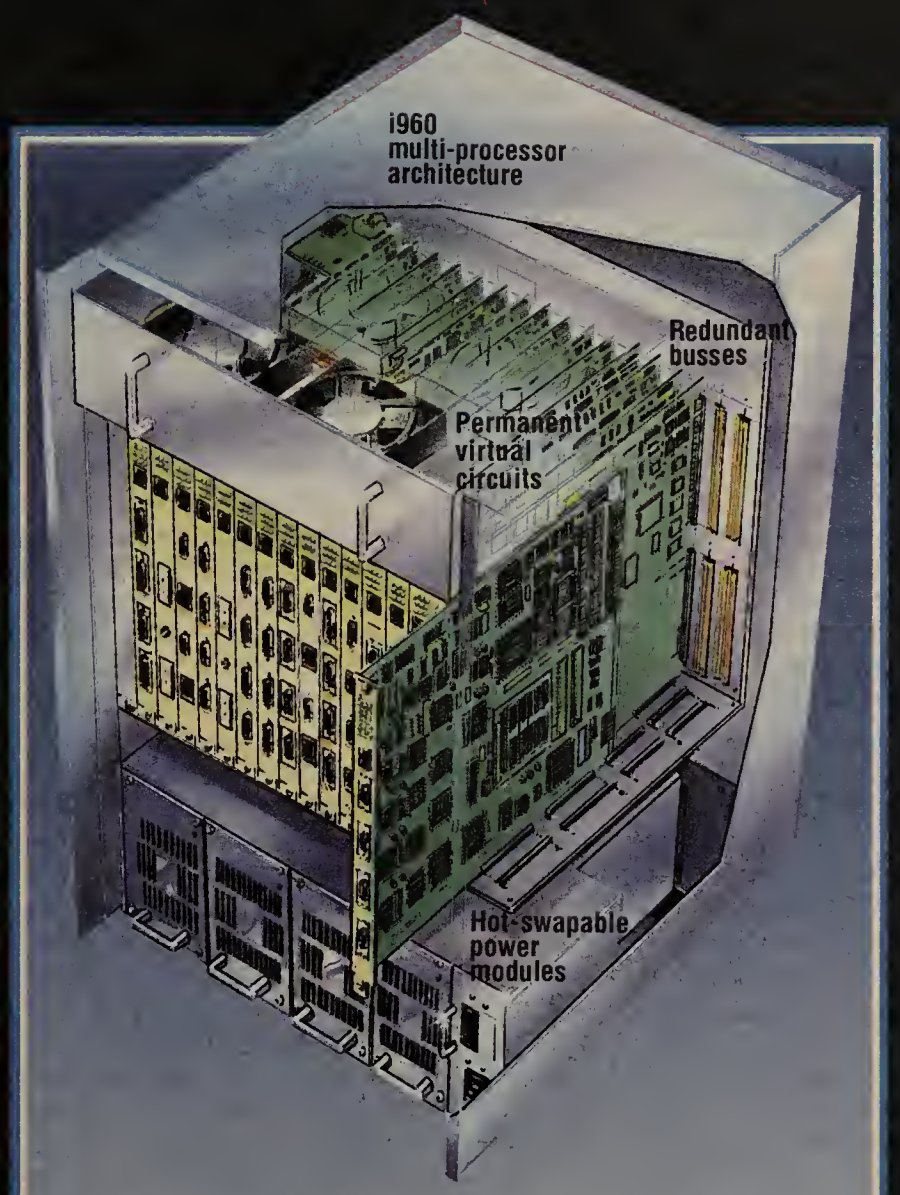

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Net execs with say in corp. planning get bigger budgets

BY BILL BURCH

Washington, D.C.

If you're a network manager, taking part in corporate planning can win you a bigger budget, according to an International Communications Association (ICA) survey.

The survey showed network technology is strongly supported by upper management.

In a survey of 200 network managers in Canada, Mexico and the U.S., the ICA found that those who take part in corporate planning have budgets 2.8% larger than those who do not. The survey, the ICA's fifth annual, covered executives working for companies with an average of 19,900 employees and average annual revenues of $5.5 billion.

The ICA survey revealed that network technology enjoys substantial support among upper management. Fifty-four percent of senior management said they believe telecommunications is very important to companies vs. only 1% that said it was not important.

For some of the survey's respondents, the past year has been felicitous. In particular, the financial services industry enjoyed solid revenue growth, and the network budgets of the companies in that field rose accordingly. But North American businesses outside the financial services arena are apparently feeling the recession, having cut network budgets 2% on average.

The recession's effect showed up in cuts in major projects, with one-quarter of managers saying projects have been delayed or canceled outright. Part of the reason for these cancellations has been upper management demanding quicker payback on projects, the survey found.

Future spending plans show a modest increase for data communications, the largest component of network budgets. That increase in data budgets is expected to be offset by a decline in spending on voice services. The fastest growth in network expenditures is for video communications, but the new service remains a relatively small part of overall spending.

When it comes to running networks, the survey found three-fourths of network managers have sole responsibility for voice communications.

Control over data communications is more diffused. Only one-quarter of network managers have sole responsibility for local-area networks, personal computers and workstations, for example.

And while telecommunications managers are in large part responsible for the voice component of wide-area networks, almost half have to share control over wide-area data networks.

For the third year in a row, the ICA survey found executives most concerned about network management, with survey respondents selecting it as the top item they would like to outsource. However, when it comes time to turn over control, many managers have balked. Instead, the most frequently outsourced item is net installation.

WilTel

Continued from page 28

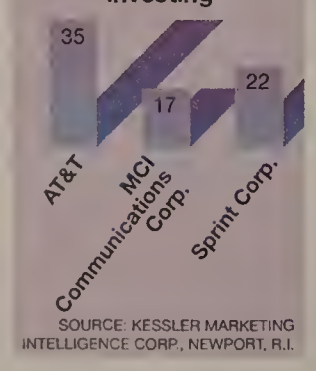
WilTel in the U.S. that swaps network capacity with several domestic carriers.

One source close to WilTel said the carrier may be close to signing an agreement to swap network capacity with IDB-WorldCom, which provides network services to many foreign countries. A WilTel spokesman would neither confirm nor deny that report.

Thomas Soja, senior analyst with Kessler Marketing Intelligence Corp. (KMI), a Newport, R.I., firm that tracks fiber systems worldwide, said WilTel can resell capacity on a plethora of existing or planned international fiber cables (see chart, page 28).

Ante up

Number of existing or planned fiber cables in which carriers are investing



SOURCE: KESSLER MARKETING INTELLIGENCE CORP., NEWPORT, R.I.

"The opportunities are endless," Soja said.

The carrier has not ruled out buying transponder capacity and providing international services via satellite, though that possibility seems unlikely.

"We've tested satellite [connections] for backup applications, but I think we'd want to keep our international network consistent with our domestic network [which uses fiber]," a WilTel spokesman said.

Although it has not yet formulated a pricing strategy for its planned international services, the carrier will offer users bulk discounts and multiyear contracts.

"It's a little too early to be talking about pricing for specific services," the spokesman said. "But the international services will be competitively priced."

Australia

Continued from page 28

switches from a single vendor, preempting any interoperability problems, and expects to choose that manufacturer later this year. Eventually, the carrier hopes to interconnect with other carriers' networks, and is following progress on the network-to-network interface standard under consideration by the U.S. ATM Forum. In general, Telstra plans to follow the International Telecommunication Union's broadband standards, according to Dorman.

So far, Telstra's research has not turned up any immediate market for 155M bit/sec service, but some large customers are interested in multimedia applications and high-speed local-area network interconnection. Also, libraries and publishing companies have plans for ATM's high-quality image transfer. Other target industries include medicine, engineering and scientific research.

During the experimental phase, Telstra will charge $41,000, per port per year. That price works out to around $3,425 per month, for which users get an effective transmission rate of 130M bit/sec on a network with limited connectivity.

Know the enemy: How hackers ply their trade

BY MICHAEL O'CONNELL

To successfully combat toll fraud, users must know their enemy and his tendencies.

Hackers are becoming increasingly sophisticated in the means they use to tap into user networks and place fraudulent calls, always seeking to stay a step ahead of user attempts to thwart them. Only by knowing how hackers are likely to strike can users be fully prepared to defend themselves.

Hackers exchange information through electronic bulletin boards, stolen voice mailboxes and various publications, enabling one hacker to start picking at a phone system where another left off.

Naturally, hackers prefer to use 800 numbers as a means to tap into a user's phone system because the victim pays for the calls. However, if the system does not have toll-free facilities, local direct-inward dialing numbers are a low-cost alternative.

O'CONNELL

TARGETING DISA PORTS

In 1990 and 1991, hacking was targeted at direct-inward system access (DISA) ports. With DISA, traveling employees or workers at their homes can dial a single 800 number to access and place calls through their company's private branch exchange.

DISA offered users savings of up to 40% over credit-card calls. But as a result of hackers targeting the feature, 80% to 95% of PBX administrators have disabled it.

For those companies that still use DISA, identifying this type of hack starts with noting an exceptional number of short calls. This results from the hacker's "war dialer," a personal computer-based program that attacks the user-identification code and/or password that protects the DISA feature. War dialers are capable of hacking up to 20 lines at one time. The system can break a four-digit password in 28 minutes and an eight-digit one in under six hours.

Other hackers use special software that targets only the 15% of all possible alphanumeric combinations that represent common passwords, such as area codes and birthdates.

Beginning in late 1991, hackers started targeting voice mail and automated attendant systems. Hackers try to get the system to transfer an inbound call back into the telephone system as if it were an extension of the PBX.

For example, a hacker could use an automated attendant to place a call to the Caribbean by masquerading as extension number 9180, which is likely a nonexistent, or "phantom," extension.

In this example, the hacker would call into an automated attendant and respond to the system query for the desired number by pressing 9180 plus the pound sign. The hack depends on the automated attendant turning 9180 back to the PBX, where 9 seizes a trunk and 1-80 starts the call to the Caribbean. The hacker would then dial the remaining digits to complete the call.

To thwart this type of attack, users can create a list of all extensions that are allowed to use the switch to make outbound calls. The PBX can then be programmed to give only those extensions access to outbound trunks.

In mid-1992, hackers started becoming concerned that call accounting systems would track their moves and began concentrating on blinding these systems. One way they do this is using Autovon Signaling.

Autovon is a special net for the military that can be used, for example, if the carriers' nets are knocked out in a war. Autovon keypads have more numbers than existing push-button phones and confuse call accounting systems.

Hackers use Autovon dialers to try to confuse a switch into providing access to place fraudulent outbound calls, hoping the additional numbers will trick the PBX as well as confuse call accounting systems. Although many PBXs do not know what to do with the extra entries and hang up on the hacker, some let them make long-distance calls. Unfortunately, there is no foolproof way to combat this problem. Hackers also attack voice mail systems, which are frequently equipped with an out-dial feature that can be used to place fraudulent calls from the system.

Maintenance ports are also vulnerable. Although most telephone systems can have several layers of passwords, users leave the ports open to calls from switch makers' remote diagnostic facilities.

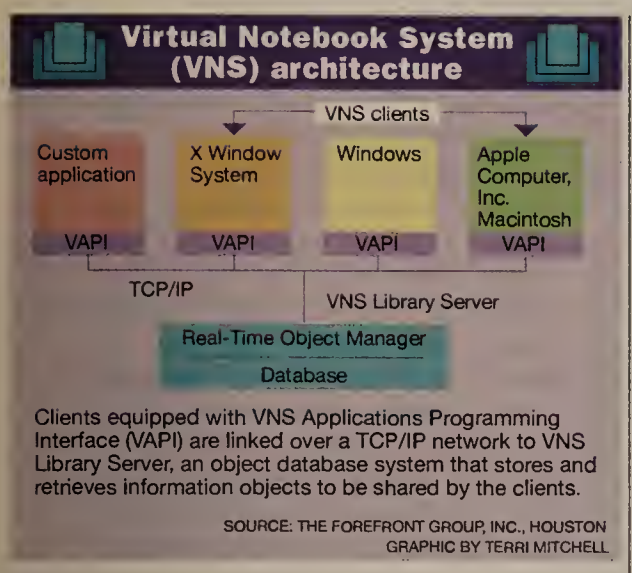
It's not uncommon for vendors to ship all of one type of PBX with the same password and rely on users to change them. Worse still, all the technicians in a user firm may report to the same foreman and use the same password for every PBX in the firm's network.

Users should at least establish passwords by the geographic region that each technician covers. Also, they would be wise to use a separate password for every PBX in the network.

As users have chased hackers from DISA to voice mail, from voice mail to maintenance ports and from maintenance ports to modem pools, there has been one constant: Hackers are relentless and will reattack the PBX from a different direction. To be effective in the long term, the antihacking system must stop and track attempts targeted at the entire communications environment.

The growing resourcefulness of hackers can only be countered with an intelligent defense, an area where artificial intelligence can be effectively applied. The PBX must be given the ability to differentiate legitimate users from thieves without penalizing users and anticipate the bad guy's next move.

O'Connell is vice president of marketing at Xiox Corp., a Burlingame, Calif., maker of antihacker systems.



Clients equipped with VNS Applications Programming Interface (VAPI) are linked over a TCP/IP network to VNS Library Server, an object database system that stores and retrieves information objects to be shared by the clients.

SOURCE: THE FOREFRONT GROUP, INC., HOUSTON
GRAPHIC BY TERRI MITCHELL

Groupware maker widens client support

BY BOB BROWN

San Jose, Calif.

The ForeFront Group, Inc. last week unveiled Microsoft Corp. Windows and Apple Computer, Inc. Macintosh clients for its Virtual Notebook System (VNS) groupware, which had previously supported only Unix systems.

The new clients are designed to interoperate with ForeFront's existing Unix client and server offerings for VNS, which evolved from a system developed at Baylor College of Medicine in the mid-1980s. The new software was shown at the GroupWare '93 conference here.

ForeFront, which was formed in 1991 to commercialize the Baylor technology, has positioned its software as a third-generation groupware product that allows workers to share information simultaneously from their desktops.

The Houston-based company's client software allows users to access and manipulate data stored in an object-like fashion on ForeFront's server software, which runs on a database server.

ForeFront officials described first-generation groupware products as store-and-forward based systems, while second-generation offerings — such as Lotus Development Corp. Notes — are based on database replication technology.

VNS ARCHITECTURE

On the client side, VNS was designed to mimic a physical notebook but features the electronic hooks needed to support multimedia information and shared use, said David Sikora, vice president of sales at ForeFront.

End users can create multiple notebooks, some of which are private and others that can be shared. Using text commands and clicking on icons, end users can establish links among notebooks and existing applications, such as spreadsheets and word processing documents.

The client software must support the VNS Applications Programming Interface to interact with the server, known as the VNS Library Server, according to Andy Burger, vice president of development at ForeFront. Client and server systems communicate via a proprietary ForeFront communications protocol that runs over Transmission Control Protocol/Internet

See **Clients**, *page 34*

Database vendors race to offer NT versions

The race to win market share is under way.

BY PETER LISKER

With the imminent general release of Microsoft Corp.'s 32-bit Windows NT operating system, leading database vendors are rushing to put the final touches on NT versions of their products.

The prospect of quickly establishing a strong position for their relational databases in this new operating environment has spurred a frenzied race among suppliers to be the first to deliver an NT offering and gain market share at the expense of rivals.

In fact, Informix Software, Inc. will take the bold step of releasing its Informix SE product for NT without even going through a beta release of the product.

Informix, which anticipates a late August delivery date, is stressing that its NT product required no reengineering, but is simply a port of the popular Unix version of Informix SE.

"We've been demoing the NT version of SE for three months and are confident the product is stable and will be well accepted by users seeking to move to NT," said A.J. Brown, Informix's director of product marketing. "Users will be able to unplug their Unix boxes if they want, put an NT-based system in and be up and running with virtually no change to any of their applications."

Meanwhile, Sybase, Inc. is preparing a blitz of products designed to fulfill a range of user requirements for the move to NT. SQL Server Version 4.2 — the version Microsoft sells as SQL Server — for NT is currently in beta test and will be released within two months.

Other Sybase products, including Omni SQL: Gateway, SQL Server Unix for NT and the company's flagship SQL Server Version 10, will debut in early 1994.

The company is also working on porting its multimedia development tools package, GainMomentum, to NT and will offer Replication Server, its database replication system, for the new Windows version in 1994.

"We see a tremendous amount of interest in NT, but it is still up in the air as to how readily corporate information services will adopt the platform. I think the real value in NT will be that it allows IS to centralize control of distributed processing at the LAN level," said Sarah Forsman, director of desktop products for Sybase.

Taking a more studied approach, Gupta

See **NT versions**, *page 34*

Easel enhances tools for client/server apps

BY BOB BROWN

Burlington, Mass.

Easel Corp. last week introduced a revamped set of client/server application development tools that support wider SQL database access and links to computer-aided software engineering (CASE) tools.

Easel is moving beyond its Easel Workbench development software with its new Enterprise Workbench graphical user interface (GUI)-based tools for building enterprise client/server applications. The company also said its Renovator Plus tool, used for developing GUIs for legacy applications, a process known as screen scraping, will be sold separately from the Workbench as the Renovator Plus.

"Easel is looking to break away from its reputation as just a screen scraping company," said Liz Barnett, a vice president at New Science Associates, a Westport, Conn., consulting firm. In many ways, Easel's client/server development software is more flexible than more popular products, she said.

Among the new tools within Enterprise Workbench is DB/Assist, a GUI tool designed to let developers easily build SQL database access into applications. Initially, the product will let developers build, test and edit SQL application logic for access to IBM's SQL databases. It will enable developers to build static SQL statements for transaction-oriented applications and dynamic SQL statements for ad hoc applications.

Previously, a significant amount of hand-coding was required to build SQL access into applications using Easel's software, said John Canestraro, vice president of product strategy at Easel.

Enterprise Workbench's other major new tool is called Continuity, which enables developers to use design and analysis output from CASE tools as the basis for new client/server applications. Having the CASE-generated analysis and design information at their dis-

See **Easel**, *page 34*

Pricing for new Easel tools

Enterprise Workbench SQL Edition for OS/2	$5,995
Enterprise Workbench SQL Edition for Windows	$3,995
Enterprise Workbench Corporate Edition for OS/2	$10.900
Enterprise Workbench Corporate Edition for Windows (Corporate Editions include all client/server options, such as peer-to-peer communications, distributed presentation and transaction processing.)	$8,900
Continuity	$10,000 per server ($7,500 introductory price through September)
Renovator Plus for OS/2	$9,900
Renovator Plus for Windows	$7,900

Note: All pricing per developer, except where noted.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: EASEL CORP., BURLINGTON, MASS.

BRIEFS

Powersoft Corp., based in Burlington, Mass., last week announced that its client/server development and database access tools will support Digital Equipment Corp.'s Rdb relational database and Windows NT/Alpha AXP computers.

Powersoft and DEC will team to market their products jointly.

Powersoft's new Rdb Database Development and Deployment Kit will enable PowerBuilder, PowerMaker and PowerViewer running on Windows personal computers to connect via Microsoft Corp.'s Open Database Connectivity protocol directly to Rdb databases running on all DEC platforms.

Even PowerBuilder applications written for other databases will be able to access Rdb databases. Powersoft will also ship a Windows NT version of its software to run on the DECpc AXP/150 PC.

Powersoft's Rdb Database and Deployment Kit will be available this quarter for $3,195 per copy.

Users' first copy will cost $495 under a promotional offer through Nov. 30.

PowerBuilder/NT for the DECpc AXP/150 PC will be available by year end. Pricing was not announced.

Powersoft: (617) 229-2200.

Simpact Associates, Inc. of San Jose, Calif., and **SoftSolutions Technology Corp.**, based in Orem, Utah, last week announced that they have integrated Simpact's Remark voice server software with SoftSolutions' Windows-based Document Management System.

The effort will enable users to embed verbal annotations within documents and treat voice files as documents to be managed by the Document Management System.

Remark for SoftSolutions will be available in the fourth quarter.

See **Briefs**, *page 34*

DISTRIBUTED DATA

Microsoft releases database links for Windows apps

BY PETER LISKER

Redmond, Wash.

Microsoft Corp. has announced the availability of Open Database Connectivity (ODBC) Desktop Database Drivers that will make it easier for developers to integrate Windows applications with desktop databases.

The software drivers have been sent on to duplication for commercial release and will be available within three or four weeks for general distribution at a suggested retail price of $49.

Licenses for commercial and corporate internal users will be available.

ODBC is the database component of the Windows Open Services Architecture that provides Microsoft applications with standard interfaces to a wide array of services such as mail, databases and networking communications.

ODBC is expected to provide broad access to data on host systems or desktop machines.

This new set of drivers provides access to desktop databases, including Microsoft Access database management system Versions 1.0 and 1.1, FoxPro DBMS Versions 2.0 and 2.5, Microsoft Excel 3.0 and 4.0, Btrieve 5.1, dBASE III and IV, and Paradox 3.0 and 3.5 as well as formatted text files.

"Customers now have a single set of database drivers to access the most popular desktop databases," said Kyle Geiger, ODBC general manager at Microsoft.

"Users can work with a variety of databases in a consistent manner from within any ODBC-enabled application," he said.

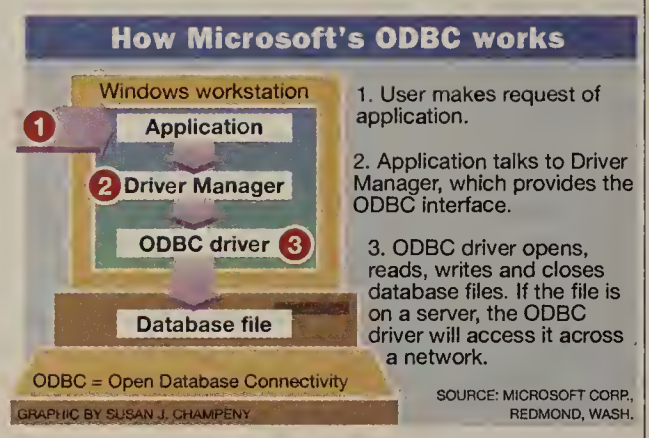
"The drivers will make it easier for corporate developers and independent software vendors (ISV) to deliver new ODBC-enabled applications."

Microsoft is making the drivers available for commercial redistribution, which allows software vendors to ship the ODBC drivers with their applications. Each of the drivers includes an extensive help file that provides detailed information about what functionality is available to the developer.

"We expect that ODBC will become the predominant industry specification for linking desktop DBMSs to Windows applications," said Colleen Lambert, marketing manager for ODBC at Microsoft. "ODBC also is important because it provides a C language interface so developers can integrate custom code to create innovative systems."

The announcement of the ODBC drivers was met with excitement from potential ISVs.

"Powersoft is committed to providing access to a variety of desktop data sources from the Enterprise Series of products," said Bill Critch, director of business and alliance programs for Powersoft Corp. "To deliver on this commitment, we have adopted ODBC as our primary database interface."



Powersoft's Enterprise Series products include the PowerBuilder client/server application development system, PowerMaker and PowerViewer.

Developers said users will benefit by having out-of-the-box support for an variety of desktop databases and by having the ability to easily access multiple databases from within a single application.

Corporate customers agreed.

"The development of a common application program interface that will allow various front-end data access and reporting tools to access different databases is just what the industry needs," said Salvatore Scipione, manager of the Technology Resource Center for Independence Blue Cross.

Clients

Continued from page 33

Protocol networks, he said.

The VNS Library Server's Real-Time Object Manager (RTOM) works with a user's existing SQL database or a set of database routines available in most Unix operating systems. The RTOM software enables the database to store and retrieve object-like data used to create the notebooks, Burger said.

The server acts as a library containing information about notebooks, links between notebooks and objects within the notebooks. The server allows multiple users to simultaneoulsy access objects and reflects changes immediately to allow for real-time conferencing, Burger said.

Roger Turner, concurrent engineering manager for the Composites Automation Consortium in Burbank, Calif., a beta-test site for ForeFront's Macintosh and Windows clients, said the new clients are a welcome addition to the groupware software.

The new clients make it easier for members of the consortium — most of whom rely on Macintoshes and personal computers — to collaborate on a program called the Composites Automation Manufacturing Initiative, he said.

"We think a concurrent, collaborative approach is essential for this project," Turner said, "so we need to have the members connected to one another from their desktops."

ForeFront's Windows client operates under Windows 3.1 from Microsoft Corp., while the Macintosh client operates under Apple's System 7. Both require at least 4M bytes of random-access memory and 1.5M bytes of hard disk storage. ForeFront's software costs $595 per client.

ForeFront's Unix server software runs on platforms from Digital Equipment Corp., Hewlett-Packard Co. and IBM, among others, and costs $6,000 per server.

✆ForeFront: (713) 961-1101.

Easel

Continued from page 33

posal, developers can build more structured client/server applications, a key consideration when building applications for enterprise nets, Canestraro said. "As users begin to develop more complex applications, they want tools that can manage that complexity," he said.

Integrating Easel Workbench with CASE tools based on the widely supported External Source Format allows users to leverage investments in tools that have been used primarily to build host-based applications, he added.

Along with other enhancements, Enterprise Workbench can build applications for IBM's 32-bit OS/2 2.1 operating system, which means better performance for developers and end users.

Easel's Renovator Plus software is designed to let developers build personal computer front ends to legacy mainframe applications. The software features the basic Enterprise Workbench platform combined with Easel's Distributed Presentation Option, which includes tools that automate the development of communications logic for 3270 and 5250 protocols, among other things.

CANESTRARO

Enterprise Workbench will be available in October (see graphic on page 33 for pricing information).

✆Easel: (617) 221-2100.

BRIEFS

Continued from page 33

Pricing was not announced.

Simpact: (619) 565-1865; SoftSolutions: (801) 226-6000.

Lotus Development Corp. has announced LotusSphere '93, a new conference geared toward commercial and corporate software developers, Lotus business partners and Notes users.

The conference will take place Dec. 5-9 in Orlando, Fla. Admission is $795 with a $200 discount for registration before Sept. 15. Call (800) 655-6887 for more information.

IBM has announced the creation of two laboratories for testing integration between client/server products sold by IBM and other vendors.

IBM Networking Systems will operate a lab in Research Triangle Park, N.C., and IBM Personal Software Products will run a lab in Austin, Texas.

ON Technology Corp., based in Cambridge, Mass., last week announced a Windows version of its Meeting Maker XP group scheduling product.

Meeting Maker XP previously worked only with Apple Computer, Inc. Macintoshes, but it now will work with Windows computers, and on nets with both Windows and Macintosh clients.

Meeting Maker XP is available now and costs $57 to $79 per user.

ON Technology: (617) 374-1400.

NT versions

Continued from page 33

Technologies, Inc. will release SQLBase for NT in the fourth quarter of this year, with SQLWindows Application Development for NT due in the first quarter of next year. In addition, Gupta's Quest end-user tool for data access and reporting will be available on NT in the first half of 1994.

"There is significant interest in the database community about NT, but in reality, there will be a lag time before people start putting systems together that take advantage of NT," a Gupta spokesman said. "Our goal is to present users with a full suite of products that give them everything they need to develop and deploy applications, rather than providing only a partial set of tools that isn't full-featured."

For its part, The ASK Group, Inc. will offer NT versions of the Ingres Intelligent Database as well as the Ingres/Windows4GL graphical user interface tool and object-oriented fourth-generation language within 90 days of NT's production shipments.

"Rightsizing is a real phenomenon, not just marketing hype, and NT will be the ideal platform for organizations wanting to go this route," said Carl Tsukahara, director of technical marketing at The ASK Group.

Market leader Oracle Corp. is also hot on the NT bandwagon, with the release of Oracle Version 7 for NT, which is due 60 days after NT's production shipping.

Oracle is stressing the ability of its NT product to interoperate with its wide line of database offerings, a familiar approach for the company, which has built a reputation based on interoperability.

"Oracle believes NT will offer an outstanding platform for low-end users looking for a powerful server for desktop and enterprise applications," said Nimish Mehta, vice president of Oracle's Desktop Products Division.

"The NT system will be scalable, reliable and offer excellent performance for a broad range of users who are going to be very interested in being able to use Oracle products for a reasonable price," Hehta said.

While it is still unclear how quickly and pervasively NT will penetrate the data processing/MIS environment, there is intense interest and curiosity surrounding NT and the database arena.

For now, users and managers can expect a blitz of information about competing products that support NT.

And with any luck, there will soon be some hard data about how these products take advantage of NT's capabilities.

VIEWPOINT

by Bryan Toney

Client/server hampered by myths and confusion

Managing corporate information and delivering it to decision makers in a timely fashion are the most serious competitive issues facing businesses today. Driven by that, client/server computing has advanced from buzzword status to attainable reality.

But while client/server is well within the economic grasp of most organizations, widespread implementation is being slowed by myths and outdated deployment methods.

Four issues are keeping information systems (IS) managers from moving forward with confidence:

- Cost concerns, particularly the psychological difficulties associated with reducing dependence on that expensive mainframe.
- Architecture confusion — users are confused about the best framework for building client/server systems.
- Concerns about outdated development methods.
- The difficulties of multiplatform support.

The costs of moving to client/server can be significant. But most organizations will find it even more costly to wait — high maintenance, lease and support costs are the legacies of the mainframe era. It doesn't make sense to trash once-valuable hardware and convert to client/server overnight. An easier approach is to focus on new application development as a way to migrate to client/server. Organizations can continue to use mainframes as data warehouses, and incremental hardware costs can be limited to intermediate data servers, memory upgrades for personal computers and faster network technologies.

Promoters must fight the misconception that there is a single client/server configuration — particularly the myth that client/server systems have only two components: the server for data management and the client for user access. The best approaches sometimes require intermediate servers providing a bridge between PCs and legacy systems.

Traditional development methods can just about kill any hope of a quick or painless transition to client/server. The older "Waterfall life cycle" methodology (requirements, definition, design, construction, implementation and maintenance) presents a problem. The large gap between conception and implementation results in applications that users do not want and are sometimes obsolete.

A radically different approach, the Iterative Development Methodology (IDM), is based on the belief that it is easier to refine existing systems than to create new ones. The key principle of IDM is prototyping — making a conceptual application suddenly tangible. The goal is to deliver an application quickly into the hands of users and then fine-tune it to meet specific needs. IDM requires tools that allow quick development.

After development comes the management challenge. IS managers must already support the dozens of platforms that have popped up in their organizations.

Client/server computing embraces this diversity at both the client and server levels. Instead of trying to develop one large application that supports every conceivable user, client/server allows smaller applications that provide work groups with the information they need, when they need it and in the format that best suits them.

By focusing on user needs and existing computing environments, multiplatform issues do not have to be as daunting as they first seem.

If you are looking for more information on making the client/server shift, Apple Computer, Inc.'s vendor-independent Virtually Integrated Technical Architecture Lifecycle (VITAL) provides an excellent framework for building client/server systems that preserve and enhance investments in mainframe applications. VITAL forces IS managers to rethink how they design and implement enterprise systems.

➧Toney is president of Information Management, Inc., an Atlanta-based computer systems design and consulting company. He can be reached at (404) 377-4840 or via AppleLink (infoman).

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According to IDC (International Data Corporation), the installed base of internetworking devices has been growing at an average annual rate of over 65% for the past four years.

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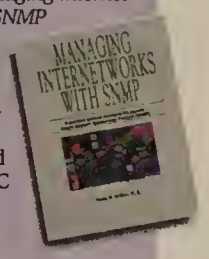

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Editorial

Cisco Systems, Inc. swallowed a bitter pill last week in announcing, in essence, the death of its Advanced Peer-to-Peer Internetworking (APPI) effort. The league-leading router vendor had pushed APPI as an "open" alternative to IBM's Advanced Peer-to-Peer Networking (APPN) — a cornerstone of IBM's plan for dynamic Systems Network Architecture networks — and established a forum to oversee APPI's development.

Parlaying industrywide concern with IBM's proprietary approach to licensing and developing APPN, Cisco quickly won support from users and other internetworking suppliers for APPI, launched with fanfare less than a year ago. But the APPI effort stalled, largely because IBM moved quickly to address concerns that threatened to slow APPN's adoption. Cisco acknowledged that last week in a brief statement, claiming it would license APPN directly from IBM and let members of the APPI Forum choose to close up shop or continue APPI's development — an unlikely decision.

Cisco's move is a good one for users. In fact, in a March Reader Advocacy Force article, we urged Cisco and other vendors to cease work on APPI in order to avoid confusion and interoperability problems for users looking to integrate local-area networks and SNA nets — a tough task facing many companies today (*NW*, March 22, page 1). That was met with concern from Cisco and others that felt we had spoken too soon.

Some will view APPI's apparent demise as a defeat for Cisco, which stumbled in an earlier effort to provide native SNA support by enabling its routers to fully emulate IBM PU 4 devices.

But, whether motivated by self-interest or customer interests, Cisco has achieved a victory for users. By bringing the issue of openness to the forefront early on in APPN's deployment, Cisco coalesced user and vendor concerns and helped spark an uncharacteristically quick response from IBM. (Cisco likely views this as a Pyrrhic victory, considering how the APPI situation may tax its reputation.)

Corporate users and internet equipment suppliers now have a stronger role in the evolution of APPN. That promises APPN will better meet user needs and be deployed more quickly. But for that promise to be realized, customers and vendors have to participate actively in the APPN Implementors' Workshop and ensure that the organization champions the needs of users. Without that, Cisco's APPI efforts really will have been in vain.

⊸ **JOHN GALLANT**

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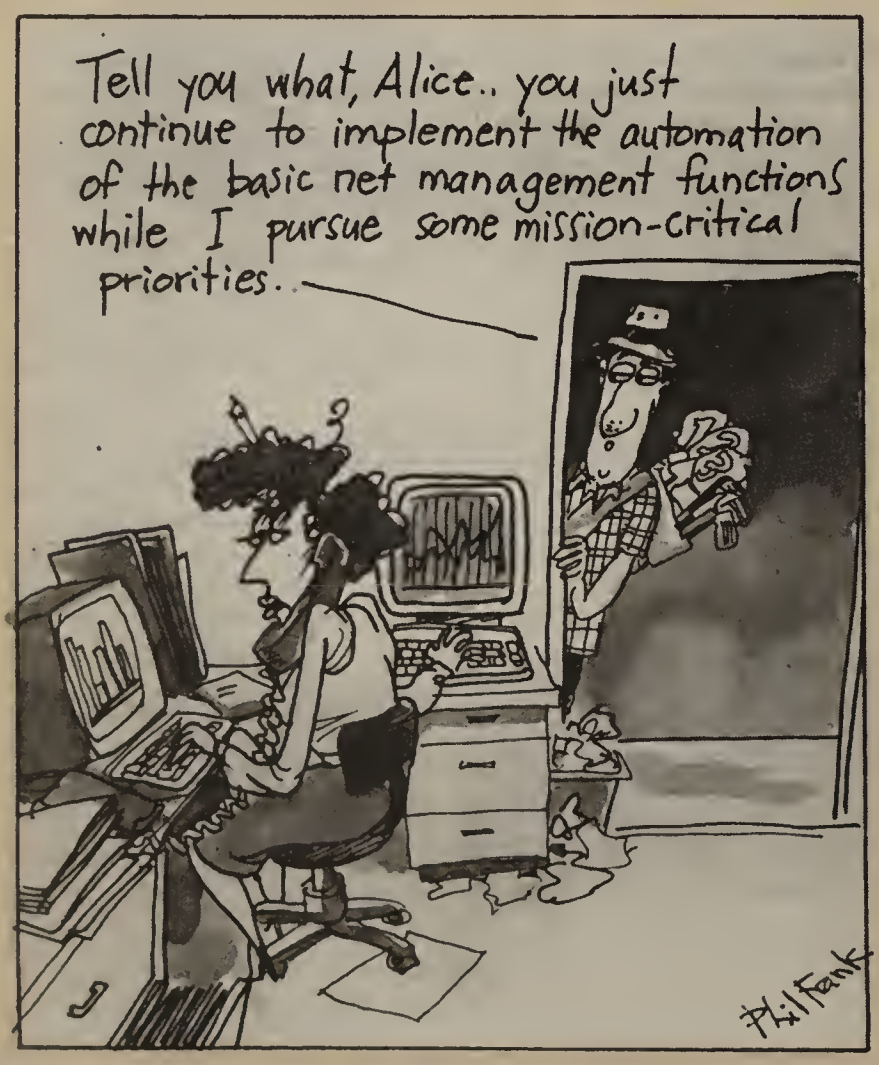

THE BLUE VIEW

By Anura Guruge

Integrating SNA and LAN traffic: It's wait and see

Despite all the talk and palpable interest over the last two years, the wide-scale cutover of Systems Network Architecture traffic to local-area network internets has yet to occur. Instead, the dreaded parallel networks syndrome, with entrenched SNA traffic riding over a dedicated backbone and non-SNA traffic traversing a nascent bridge/router-based internet, is still the order of the day.

A March survey of 766 worldwide IBM host users, conducted by Newbury, England-based Xephon PLC, shows that 92% had LANs, thus confirming that the parallel network syndrome still afflicts users. This is not entirely surprising. Much, if not all, of the technology for implementing a multiprotocol backbone capable of supporting SNA and non-SNA traffic remains unproven. Hence, most users are waiting for the technology to stabilize and be proven — by others — before they risk cutting over their networks to it.

Tad Witkowicz, president of CrossComm Corp., a provider of internetworking products to IBM customers, said "Many users are attracted to the idea of consolidating their SNA traffic onto router backbones (*NW*, Oct. 5, 1992, page 17). But between [CrossComm] and Cisco [Systems, Inc.], there are only about 15 large users that are actually doing it right now."

Tad may have understated the actual figure by a tad, but he was not far off the mark. Today, the consensus among industry experts is that less than 2,500 of the 50,000 SNA/Advanced Peer-to-Peer Networking (APPN) installations worldwide have integrated SNA and LAN traffic. This is not where we expected to be this summer.

Many vendors predicted that by this summer, most users would start to consolidate their parallel networks into a single, bridge/router-based multiprotocol backbone. The technology for realizing this would have been widely available for more than a year, they reasoned. In addition, the inevitable problems unearthed by daring pioneers in the fall of 1992 would have been resolved by this past spring. And this did happen — pioneers took the plunge, problems were found and, for the most part, fixed.

However, new problems, or at least concerns, are cropping up. One example is the recent widely publicized shortcoming of bridge/routers to fulfill the promise of giving SNA traffic priority status over other traffic, thus preventing SNA terminal-to-host sessions on internets from timing out. The problem is caused, in part, by the bridge/router's inability to differentiate between Network Basic I/O System and SNA traffic, thereby failing to give SNA the priority promised. These priority-related teething troubles were also to be expected.

What was not expected — but in twenty-twenty hindsight is patently obvious — is how profoundly disconcerting problems such as this would be to the SNA community. It wasn't as if SNA users were strangers to problems; SNA wasn't as stable 10 years ago as it is today. But herein lies the rub: SNA is stable today, and internets are not perceived as stable — and perception is more important than reality in networking today.

The real barrier to disturbing SNA status quo is the buzz phrase mission critical. Most host-resident SNA applications are deemed mission- or business-critical and will continue to be for a long time. Users won't jeopardize their mission-critical applications by dismantling proven SNA backbones for strategic, but currently worrisome, internets. So as we approach the end of the summer of 1993 and most of the SNA community is standing on the sideline waiting for things to improve on the bridge/router front, it is time to take stock and evaluate the options.

The first solution is to choose bridge/routers, taking into account that the SNA-related problems are getting fixed. Likewise, overall reliability and network availability — though possibly still not in the same league as SNA — are slowly, but surely, increasing. But with mission criticality uppermost on their minds, users aren't going to rush into pursuing this option until others have tried it first and worked out all the bugs.

The second option is to evaluate some of the SNA-based, multiprotocol LAN interconnection solutions on the market, such as IBM's Network Control Program Version 6 Frame Relay Data Circuit-terminating Equipment option, Computer Communications, Inc.'s Eclipse 7020 or Automated Programming Technologies, Inc.'s APTnet. These permit non-SNA LAN protocols to be routed across existing SNA backbones. If the current crop of offerings lives up to its performance, price and reliability claims, SNA-over-LAN technology will be a very strong competitor to today's SNA-over-Transmission Control Protocol/Internet Protocol solutions available on bridge/routers.

The last option is to wait and see how IBM's Networking Blueprint-inspired AnyNet software products — which currently permit SNA LU 6.2 traffic to run over TCP/IP or TCP/IP traffic to run over SNA — evolve over the next nine months. When available on bridge/routers in late 1994, AnyNet technology will permit multiple protocols to be routed across an SNA/APPN, TCP/IP or OSI backbone.

Whereas today's bridge/router-based backbones have multiple protocols flowing across them, AnyNet backbones will use a single protocol. The other protocols are converted to a single protocol by AnyNet bridge/routers at the periphery of the backbone.

This single-protocol approach, in theory, permits easier integration of reliability and prioritization features into the backbone. Rather than adding them to all protocols and dealing with conflicts between them, they can now be included in just one backbone protocol. This is theory; practicality is what is required.

So "wait and see" seems to be the bottom line for now. Obviously, the technology is here; it is just a matter of smoothing out the wrinkles. So the summer of 1994, rather than 1993, will see the start of the consolidation of today's parallel nets. But by then, Asynchronous Transfer Mode will be looming on the horizon. Another option? We'll have to wait and see. Until then, enjoy the rest of the summer.

⊸ Guruge is an independent consultant specializing in internetworking and IBM network architectures. He writes extensively, presents seminars worldwide and can be reached at (603) 878-1303 or via Internet/MCI Mail at aguruge@mcimail.com.

REGULATORY ISSUES

By Alan Pearce

Hundt a good choice for users

From a user perspective, the nomination of Reed Hundt as chairman of the Federal Communications Commission is good news. There are two major aspects of Hundt's career that make him attractive to and sympathetic toward users of telecommunications services and equipment.

Foremost, if Hundt is confirmed by the Senate in September as expected, he will be the most politically connected FCC member ever to head the agency. Hundt, a consummate Washington, D.C. insider, attended high school with Vice President Al Gore and law school with President Bill Clinton. He also knows their wives and top political advisers.

In addition, Hundt is well known on Capitol Hill, largely thanks to his long and close friendship with Gore, who has used him extensively as an adviser on economic and environmental issues. Furthermore, as an expert in antitrust law, Hundt advocates more competition in all segments of the telecommunications industry. Hundt also favors the early introduction of new technologies that will enable users to more quickly obtain new services and equipment. This means more choices for users and at what should be lower prices.

Hundt's only weaknesses appear to be his lack of knowledge of the FCC's internal workings and the fact that he is unknown by the senior staffers there. But these are handicaps most of his predecessors also faced. Hundt should have no problem mastering the management of the agency, especially if he chooses FCC insiders to serve on his personal staff.

If confirmed, Hundt faces five major issues:

He must decide how to help the Clinton administration develop its plan to enhance the U.S. telecommunications infrastructure so that it remains second to none. This is a top priority with Gore, whom Hundt owes big time for urging the president to appoint him FCC chairman. But Hundt, who is smart and experienced in Washington politics, will attempt to get policy operating flexibility.

The FCC must explore a variety of infrastructure options to see whether or not billions of dollars can be saved by utilizing and upgrading the existing copper-based network. Everyone, it seems, is talking fiber to the home, but no one seems to know what it will cost or whether users will be able to afford it.

He must also strive to bring the benefits of new technologies — not to mention the services and equipment associated with them — to the American public as soon as possible. Here, the FCC will not only decide policy, but may also help the government act as an early adopter in order to help new technologies create new markets.

Acting as an agent of change, he must work hard to establish domestic and international standards. Hundt is going to explore whether or not standards are being used anticompetitively. He will also focus on whether the government should play a more prominent role and even act as a national standards coordinating organization.

He must also attempt to overcome the FCC's policy setbacks at the hands of the higher courts. As users know, the FCC's policies on the convergence of computers and communications are still before the Ninth Circuit Court of Appeals in San Francisco while the decade-old Forbearance Doctrine — which applied a light-handed regulatory approach to some service providers — was thrown out by the Circuit Court of Appeals for the District of Columbia last November.

These court setbacks have got to stop, which means that the FCC's policymaking has got to move onto safer legal ground. That is, it must conform to the Communications Act of 1934, or the act itself must be changed. Hundt is well equipped to move in either direction.

Lastly, he must introduce and implement effective reregulation of cable television, which was mandated by Congress last year. CATV is extremely unpopular in Washington, D.C. because, according to politicians and policymakers alike, the CATV industry exploited the deregulation given it by Congress in 1984 by imposing dramatic price increases on users. As an act of revenge, Congress probably went too far when it ordered the FCC to reregulate CATV.

Now Hundt is stuck with the bureaucratic consequences — some would say nightmare — of rate regulating thousands of CATV systems throughout the nation, which have been ordered to roll back rates this fall. He must get from the Hill some policy-making flexibility in cable rate regulation and also more money so he can hire the people needed to police an industry segment that has consistently proven it needs effective policing.

Addressing this issue could chew up a considerable amount time. If it does, Hundt may not be able to resolve the other four policy issues.

Is Hundt up to the task? Certainly. He is both tough and smart, and will not take any of these issues lightly. Indeed, because he is so politically well connected, who is better qualified to get the job done? Users should welcome him. He's likely to be their friend.

Pearce is president of Information Age Economics, Inc., a telecommunications research firm in Washington, D.C. He can be reached at (301) 320-3608.

Letters

Signal significance

Your recent article "Mobile nets: strings attached" (July 5, page 24) contained the following statement, which deserves to be addressed:

"RAM Mobile Data [Inc.], meanwhile, provides good nationwide coverage but offers mediocre signal penetration into buildings due to its radio signaling, according to [Alan] Reiter."

Simply put, signal penetration is a complex issue.

First, RAM Mobile Data's Mobitex technology is not the reason for varying levels of signal penetration in buildings. Rather, radio signal penetration hinges on the proximity of the building to a base station as well as the building itself.

The closer a building is to a base station, the better the signal penetration. In this context, better means that the stronger the signal, the deeper it will penetrate a building.

The construction of the building itself is also a factor in signal penetration. If it is made primarily of metal with little glass, signal penetration will not be as good as if the reverse is true.

This sets the stage for the larger issue, Reiter's description of RAM Mobile Data's signal penetration as "mediocre." We prefer to describe it as "ample." Here's why.

On the whole, RAM Mobile Data's in-building signal penetration is competitive with, if not superior to, ARDIS Co.'s in the top 210 markets we serve.

As a point of comparison, RAM has 17% more base stations in its top 100 markets than ARDIS does. This translates into better coverage and in-building penetration.

RAM Mobile Data's coverage and in-building penetration are compatible with ARDIS' in its additional 110 markets.

The fact that RAM Mobile Data's shared two-way wireless data infrastructure was built from the ground up underscores this contention.

As a result, base stations are located strategically around the nation to serve where customers' needs are greatest.

Since ARDIS evolved from a proprietary network serving IBM field service personnel, its signal penetration in buildings housing that personnel is excellent, but not as good as in other buildings in the same city.

RAM Mobile Data improved signal penetration across the board in its Phase I network build-out, completed in June. The 12-month project increased the number of base stations in RAM Mobile Data's networks from 210 to 840.

Charles Nahabedian
Vice president of corporate development
RAM Mobile Data, Inc.
New York

Editor note: Alan Reiter, editor of the "Mobile Data Report" in Alexandria, Va., stands by his opinion that RAM Mobile Data provides good nationwide coverage but offers mediocre signal penetration.

Mr. Reiter says, however, that is more a question of the coverage provided by RAM Mobile Data's base stations and not an inherent weakness of the signaling technology, as originally reported.

Mr. Reiter also says RAM Mobile Data has taken steps recently to improve its base station coverage nationwide.

See **Letters**, *page 38*

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Help desk

Continued from page 2

decide to use frame relay, you should ensure that either the frame relay concentrator will accept non-frame relay input or that the Mac bridge/router and the current data devices have a frame relay capability.

You should also check with the provider of your T-1 mux to see what frame relay or statistical mux options are available. The inputs to the mux or frame concentrator must match the outputs of the Mac LAN router and the current data equipment, and that the output of the concentrator/multiplexer must match the current data connection to the T-1 line.

I have a Novell, Inc. NetWare 3.11 network. Whenever I try to print a copy of a complex graph created in Microsoft Corp. Excel 4.0 to a Hewlett-Packard Co. III laser printer over the network, the entire graph won't print. Can you help?

Mike Yocca, Jeannette, Pa.

Ronald Nutter, escalation manager of 900 Support, a 24-hour, seven-day-per-week Novell technical support company in Lake Oswego, Ore., replies:

First check the amount of memory in your laser printer. To print complex graphs, the printer should have at least 1M byte of printer memory — 2M bytes might even be required.

Another possible solution is to try downloading Pserv4.ZIP from the NOVLIB forum on Compuserve, which contains downloadable drivers and patched drivers from Novell. This will enable you to get Pserver Version 1.27, the driver that controls printing services and addresses printing service problems.

It may also help if you increase the buffer size in Pconsole, which configures printing services for the laser printer. You can do this by typing Pconsole at the DOS command line. Select Print Server Information. Then, select Printer Server Configuration. Next, select Printer Configuration. Finally, select the printer of which you want to change the configuration. The default setting for buffer size is 3K bytes; increasing it to 6K bytes is advised.

If you are using a capture statement to send your graphic to the printer because your application cannot talk to the network printer, try the No Tab (NT) and No Form Feed (NFF) options on the capture command line. NT turns off tab translation so tabs aren't converted into spaces but are left as tabs. NFF turns off the paper's form feed, preventing extra pages at the end of the job. The print job will then go directly to the printer without having to do any translations.

We are looking for the fastest way to send facsimiles on our network. Should we use a fax modem, dedicated fax machine or some other alternative?

Gunner Nelson, Washington, D.C.

Michelle Hollis, a network systems engineer at Syntrex Technologies, Inc., a network systems integrator in Eatontown, N.J., replies:

Ideally, on a network, a dedicated fax server would be a faster solution than either the fax modem or dedicated fax machine. A fax server's processing power is dedicated solely to faxing, while a fax modem runs on a workstation that must allocate processing power for other applications as well as faxing. Unlike a fax modem or stand-alone machine, a fax server uses multiple telephone lines and, therefore, can send faxes from multiple users simultaneously. In addition, fax servers can receive and send simultaneously — something fax modems and some stand-alone fax machines can't do.

Fax servers are faster than dedicated, stand-alone fax machines in that end users don't have to leave their desks, prepare cover sheets and manually feed the document into the fax machine. Having a fax server is like having a dedicated fax machine on the network without having to feed the pages yourself.

Three fax servers you may want to investigate are Castelle, Inc.'s FaxPress, Biscom, Inc.'s FAXCOM and Cracchiolo & Feder, Inc.'s RightFax. FaxPress prices range from $3,495 to $4,395; FAXCOM prices range from $2,495 to $9,995; and RightFax costs from $1,890 to $5,980. For more information on these products, you can reach Castelle at (800) 289-7555, Biscom at (800) 477-2472 and Cracchiolo & Feder at (602) 327-1357.

Letters

Continued from page 37

Plea for addresses

I am waiting to see why your publication doesn't publish manufacturers' addresses.

I have been in the personal computer retail market since 1978. Since then, all of the computer product manufacturers have built their businesses from dealers and from your type of publication.

In the last two years, I have seen a reduction in the information about manufacturers or new products in your articles — mainly the address, facsimile and 800-number information.

Do the publishers and the phone companies have something going? If your editorial department were in the retail market, you would see my point.

It's cheaper for us to put a $.29 stamp on an envelope than it is to call even an 800 number. Most manufacturers have fancy automated phone systems, and after five minutes, you may get in touch with a salesperson's voice mailbox promising you a return call. But 99% of them never return calls.

As a retailer and a sales department manager, I've found the $.29 stamp has saved my company time.

In a week or so, a full-color brochure arrives showing me the product, salesperson or distributor to contact.

As a retailer, we cannot take the time to read your publication, and I request to be removed from your circulation list.

Your publication does not help us by providing vendor phone numbers but not addresses.

There are plenty of other trade publications that have all the product information a good retailer needs.

Joseph Uhrmacher
Computer sales manager
Gaffaney's of Minot, Inc.
Minot, N.D.

Editor's note: In all new product announcements, Network World *includes both the vendor's phone number and the city where the company is located.*

We try to use 800 numbers wherever possible to save readers money.

We use phone numbers rather than addresses for two reasons: so that readers can get more timely information and to conserve space so that we can get more new product information into each issue.

(Readers: Are you running into similar problems of getting product information via phone? Let us know what you think on this issue.)

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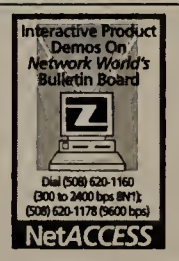

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Despite the intense allure of high-speed public net services...

...private lines shine brightly

BY CHRISTOPHER FINN

Anyone who thinks the light is dimming on high-speed private lines hasn't taken a close look at the market recently. Sure, the intense and highly focused beacon shed by such upstart public data net services as frame relay, Asynchronous Transfer Mode and Switched Multimegabit Data Service are attracting some users.

After all, these emerging services can take advantage of the inherent mesh networking and higher switching efficiency of the public network to provide connectivity to more sites than a traditional private line operating at fractional T-1 speeds and above. What's more, users can dynamically draw from a seemingly unlimited pool of carrier bandwidth.

However, those public services aren't quite ready to take on the entire world just yet. So the same carriers developing these advanced services have been spiffing up their traditional, somewhat staid high-speed private-line offerings to the benefit of end users.

In fact, carrier rollout of fractional T-3 private lines and new intermediate fractional T-1 speeds are keeping some users married to private lines. In other cases, improvements in private-line reliability as well as new circuit rerouting and enhanced network management options are keeping users glued to private lines.

If that weren't enough, interexchange carriers are likely to extend price drops for T-1 circuits to fractional and full T-3 services.

Even the once insurmountable hurdle of costly high-speed local access is being mitigated by competitive local access and interexchange carrier access pricing plans, as well as some hardware innovation. These pricing plans attempt to silence the cries that high-speed access, not the cost of wide-area transport, is the bottleneck for deployment of any high-speed service.

On top of this, high-speed private-line offerings are almost uniform in their near-perfect availability and bit error rates. So users remain comfortable that private-line nets will yield top-notch performance.

As a result, some end users appear to be pursuing an "if it ain't broke, don't fix it" policy, keeping private lines in place pending more mature public data network services.

In fact, the advent of more efficient switching technologies based on cell relay may provide additional applications for high-speed private networking. Users will swap out existing time division multiplexing equipment for cell relay switches and connect those switches via private lines. This will enable users to make better use of dedicated pipes and provide a more efficient private solution that is easier to swallow than the release of network control to the carrier, as is required in public data services.

Other user firms will fall in the middle, opting to leave private facilities behind when there is an economic advantage to using a public net service and retain private circuits when there is no economic gain.

FRACTIONAL T-1/T-3

More than anything else, end users continue to buy private circuits to meet two major bandwidth-intensive needs: aggregation of low-speed connections over a high-speed backbone and support for new high-speed applications such as local-area network interconnection and videoconferencing, both of which require greater than 64K bit/sec channels.

Most users say they purchase high-speed private circuits to aggregate many lower speed applications over a single corporate backbone. Don Moore, manager of communications technology at Aldus Corp. in Seattle, says his company's internetwork began as analog dial-up connections and only gradually became a dedicated digital router-based network.

"We worked our way up to higher private-line speeds to accommodate our growing traffic," Moore says, noting that most of Aldus' backbone network traffic is electronic mail, with client/server applications also riding the net. "E-mail traffic has grown exponentially here," and high-speed private lines are fitting the bill.

High-speed private lines are also an option for supporting LAN interconnection across wide areas, which should ideally occur at the LAN's native speed. While high-speed private lines can support native LAN protocols, they don't come cheap. Most users are not prepared to pay for 100M, 16M or even 10M bit/sec private bandwidth connections for full-time connectivity.

However, some leading-edge users are digging deep into their pockets and buying bandwidth in multimegabit chunks. Microsoft Corp. of Redmond, Wash., for example, interconnects LANs over a network of private T-3 and fractional T-3 links. The high-speed links are needed to support such LAN applications as bulk file transfers between software developers and multimedia.

Connecting remote LANs at their native speed is fueling interest in T-3 links. But for many, the 45M bit/sec of bandwidth offered by T-3 circuits is overkill. So, not surprisingly, many users are finding fractional T-3 services more ideal for connecting remote LANs at their native speed. Other users find fractional T-3 service attractive for supporting imaging and high-speed file transfer. Still others find fractional T-3 long-haul services cheaper than their existing multiple T-1s.

As with fractional T-1 services, fractional T-3 gives users a cost-effective, intermediate bandwidth option to full T-3 service. There are no standards per se for what a fractional T-3 service encompasses. The availability of certain speeds is being driven by application needs rather than standard channel increments.

WilTel was first on the market with a fractional T-3 service, offering speeds from 6M

Continued on page 40

Continued from page 39

bit/sec to full T-1. SP Telecom also offers fractional T-3 services. Both WilTel and SP Telecom require users to have a full T-3 local circuit to access their fractional T-3 long-haul offerings. Both carriers carve out contiguous T-1 channels on their T-3 backbone circuits to offer fractional T-3 speeds, making them function similarly to fractional T-1 services.

AT&T's Fractional T45 Service functions a bit differently. AT&T enables users to access the service over multiple T-1 local access circuits. At its point of presence (POP), AT&T packs those individual T-1s on any available channel on the same T-3 circuit, ensuring that the multiple T-1s are routed and monitored as a unit even though they are not bundled into contiguous T-3 channels.

AT&T's fractional T-3 speeds start at 4.6M bit/sec, the equivalent of three T-1s, and increase in increments of 1.544M to 10.8M bit/sec, the equivalent of seven T-1s.

At least one other carrier, Sprint Corp., plans to offer fractional T-3 service in the coming year.

Fractional T-3 circuits fulfill their own niche in private networking. As opposed to using multiple T-1 circuits, fractional T-3 service offers users:

■ **Smaller differential delay.** There is less delay for applications using contiguous fractional T-3 bandwidth because all channels travel the same physical path.

■ **Better trouble resolution.** Once again, because channels are routed over the same T-3 circuit, trouble resolution is more simple than trying to resolve problems with multiple T-1s, each of which could travel different paths.

■ **Lower cost.** Prices for fractional T-3 service is lower than for a comparable number of T-1s. Another cost saver is the fact that some carriers, such as AT&T, do not require expensive local T-3 access.

Customer premise equipment makers are bringing out products that ease access to fractional T-3 services. Ascom Timeplex, Inc., Larse Corp. and T3plus Networking, Inc. all make muxes with T-1 inverse multiplexing capabilities, which break high-speed data streams from end-user devices into multiple T-1s (*NW*, May 17, page 51).

For instance, a router could send data at 10M bit/sec to the multiplexer, which then splits the data into seven T-1 increments for transmission across the wide-area network. The inverse mux on the other end then takes T-1 streams and aggregates them into a single 10M bit/sec channel for transmission to the far-end router.

Fractional T-3 service is well suited to LAN interconnection, but videoconferencing seems to be a significant driver of the increased use of fractional T-1 service — specifically 384K bit/sec circuits, which seem to be the common denominator for most video applications. Carriers have seen a marked increase in demand for reserved 384K bit/sec service, specifically for this application, and are packaging 384K bit/sec service with video options.

As an example, SP Telecom has designed a video-only service offering, which has an integrated videoconferencing scheduling interface. Users looking to establish a videoconference at a specific time can dial into a scheduling application running on an SP Telecom personal computer and reserve bandwidth. When the time comes for the videoconference, SP Telecom provides the desired amount of bandwidth to the user on its Media Expresss reserved private-line network transport service.

Even though 384K bit/sec is among the most popular fractional T-1 speeds, users can now choose from among a wide variety of intermediate speeds. AT&T, for instance, now offers all intermediate bit rates, including 192K, 320K, 448K, 576K, 640K and 704K bit/sec.

This allows users to fine-tune requirements for bandwidth. MCI Communications Corp. offers the same intermediate bit rate services, and Sprint offers fractional T-1 speeds ranging from 112K to 768K bit/sec in increments of 56K or 64K bit/sec.

NET RELIABILITY

While carriers are adding new private-line speeds, they are without a doubt focusing on improving the reliability of their offerings. Most carriers concede that public network services have the inherent advantage of automatic redundancy.

However, a combination of some new routing diversity options, as well as internal and external management systems, are mitigating this difference. In some instances, these new capabilities offer some advantages over rival public services.

Lately, AT&T has been the most vocal about network reliability. The carrier has been enhancing its network with high-reliability options, which are available at no charge to the customer.

AT&T has fully implemented its much advertised Fast Automated Restoration (FASTAR) circuit reconfiguration service, which backs up user circuits with a meshed network of reserve T-3 channels. Within seconds of a cable cut, FASTAR can begin rerouting customer circuits, sometimes so fast that data applications might not even recognize the outage (see graphic, page XX). Computers in AT&T's network center automatically detect outages and start searching for spare capacity on operating circuits. One by one, FASTAR reroutes T-3s on a priority basis over excess network capacity.

Each circuit in AT&T's network carries a priority rating in the FASTAR system. AT&T assigns the priority rating based on an internally established scale. Each channel on the T-3 is graded on a scale of one to 10. Channels assigned a one receive the least priority, while those with a 10 are given the most priority. Typically, switched voice traffic is given the least priority, while channels carrying government traffic get the most priority.

AT&T adds up the ratings given to each channel on the T-3 circuit. The T-3s that have the highest aggregate total are given the highest priority.

Therefore, if users are lucky enough to share T-3 bandwidth with government traffic, their circuits may be restored faster than some other users'. However, AT&T will neither share circuit priority rankings with users nor allow users to purchase a higher priority ranking than they would typically receive.

FASTAR is a basic feature of the AT&T network and supports all AT&T services, but it most directly affects private-line services.

AT&T also has its Enhanced Diversity Routing Option (EDRO), which assures customers of full-routing diversity over the AT&T network. AT&T's premise is that it can guarantee complete routing diversity of circuits, eliminating the need to turn to another carrier for route diversity.

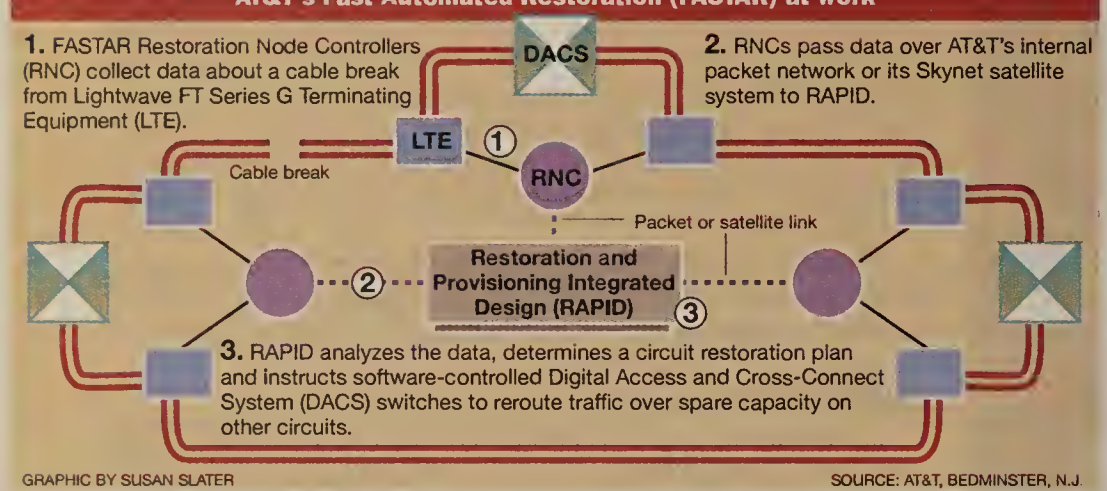
Under EDRO, AT&T makes sure customers have two circuits to each location in their private nets. The carrier guarantees that those circuits do not follow the same physical route, thus wiping out the threat that a single cable cut could knock out the primary and backup circuits. EDRO for a T-1 circuit costs $208 to install plus $52 a month. EDRO for AT&T's T-3 service costs $625 to install and $156 a month.

MCI is currently the second-largest provider of private-line services in the U.S. Its digital network is constructed with major fiber rings around each metropolitan area, providing alternate paths in case of a network outage. MCI advertises a mean time to recovery (MTTR) of two hours for all services transported via its digital data network.

Sprint, looking to bolster its private-line market presence, has been adding reliability features to its network, too. Although these features are geared at making all Sprint services more reliable, they have the most direct effect on private-line services.

Sprint provides network outage recovery via its digital access and cross-connect (DACS) 3/3 and Reverse Direction Protection Switching. These features enable Sprint to recover from cable failures more quickly than it could

Quick network redraw
AT&T's Fast Automated Restoration (FASTAR) at work



GRAPHIC BY SUSAN SLATER — SOURCE: AT&T, BEDMINSTER, N.J.

Private lines: Are they right for you?

Users trying to weigh the long- and midterm prospects of private lines against such emerging public fast packet switching services as frame relay, Switched Multimegabit Data Services and Asynchronous Transfer Mode have quite a bit to think about.

It is likely that private lines — in their present form — will have a place in user networks for a long time. In fact, analysts are predicting a slight upturn in usage of high-speed private lines through 1998. But users will continually be tempted by emerging public offerings, which promise to provide just what a user needs for each network application.

Clearly, the decision will not be easy. A recent study by AT&T Bell Laboratories states that there is no clear-cut decision tree that users can employ to make a decision between the current crop of frame relay offerings and private lines. "Some users will have a clear path of action," says Hemant Vaidya, product group manager of AT&T's Accunet Digital Services. "Most will be in a gray area."

There are, however, certain factors that will form the basis of the decision. The chief governing factor in choosing between public packet services and private lines is determining how sites need to be linked and whether every site needs to be linked to every other site or to just a few.

If communication among sites is characterized by exchanging such data as electronic mail messages, then private lines will remain the best answer. Users with a flat network structure — one in which all sites interact with one another directly — may find that public services will fit the bill.

Likewise, the debate between public and private services rages in companies that are moving toward a distributed environment that requires extensive mesh networking. Firms adopting a distributed computing environment may be better off with public services.

But other corporations are using centralized servers instead of distributed ones and could benefit from leased lines. Additionally, users that have not yet abandoned hierarchical data net architectures, such as IBM's Systems Network Architecture, will still find a use for private lines.

Another factor in the public vs. private decision is geographical dispersion. Public packet services tend to charge customers on a per-port basis with little or no distance sensitivity, while private lines are priced on a connection basis with mileage being the primary cost driver. Obviously, shorter connections will favor the private solution.

Lastly, users wonder how quickly carriers will develop disaster recovery capabilities for high-speed packet services. For instance, users would like to have a dial-up backup capability for high-speed packet services. Sprint Corp. already offers switched 56K bit/sec backup for frame relay service, but automatic restoral of service is not yet available.

BY CHRISTOPHER FINN

before, often faster than its four-hour MTTR.

Sprint's U.S. fiber network is configured in 21 loops for reliability purposes. Each Sprint POP is linked to two separate loops. If one loop fails, Sprint DACS equipment begins to search for excess capacity on the other loop. This information is presented to network operators who can then manually patch circuits from the failed loop to circuits on a functioning one.

The Big Three long-haul carriers offer competitive pricing for the interexchange portion of T-1 private lines, according to Economics and Technology, Inc. of Cambridge, Mass.

500-mile circuit	AT&T	MCI	Sprint
Month-to-month	$4,670	$4,090	$4,165
3-year contract	$3,643	$3,272	$3,665

Like other carriers, Sprint does not charge for these features because they are considered integral parts of its network.

WilTel offers a unique service that helps users rest assured that their circuits truly have diverse routes. The carrier offers customers full graphical representations of circuit paths as part of its WilView network management system.

Not only does WilView show the user how circuits purchased from WilTel are routed, but it also shows which other carriers are leasing capacity on WilTel circuits. This helps users identify whether circuits purchased from another carrier for route diversity are actually routed over the same path as the primary circuit.

Other carriers will check on customer circuit paths, but only WilTel provides this information directly to the customer.

Where reliability measures fail, carriers are putting their money where their mouth is with expanded service guarantee programs. AT&T offers its Service Assurance Warranty, which credits customers as much as 50% off monthly end-to-end circuit costs for each service affected by an outage.

Most other carriers are including similar clauses in custom contracts for private-line service. Each carrier can offer a similar pledge, but antiliability language in the tariffs covers them against any business losses resulting from a service interruption.

This language protects carriers from having to pay for business that was lost because telephone lines were down. However, very large customers are trying to force carriers to provide business loss coverage, and, in some cases, they have gotten carriers to be flexible on this matter, getting them to agree to cover the cost of lost business up to a specified limit, for instance.

NET MANAGEMENT

In the rather sticky world of WAN management, the private T-1 net has become a well-known commodity with a number of tools available from both carriers and equipment vendors to facilitate management.

However, the same cannot be said of T-3 service. While T-3 mux makers provide some limited T-3 management capabilities, such as the ability to monitor T-3 links, there is currently no service that enables users to tap into a carrier's T-3 management system and perform such functions as rerouting T-3 circuits and grabbing additional bandwidth as needed. Instead, users are relegated to calling the carrier and placing an order for desired changes.

Although there has been some talk about providing such T-3 management services, no carrier has outlined specific plans. And most analysts are not holding their breath.

"It is fine to let users manipulate circuits at the T-1 level but quite another to let them reconfigure whole T-3s," says Thomas Walton of Walton & Walton Associates, a consultancy based in Richmond, Va.

The T-3 is the biggest building block in carrier networks today, and carriers are unwilling to take the risk of allowing customers to play with these key network elements without some sort of supervision or oversight.

Users do, however, have the option of subscribing to reserved T-3 service, which can be provisioned in a matter of minutes by the carrier if the required access is available. Several carriers offer this service, including AT&T, MCI, SP Telecom and WilTel.

But users have to call the carrier to request reserved bandwidth. And this capacity is not always available all the time and to all places because carriers have only so much spare T-3 capacity to set aside for reservations.

So network managers should ask about the amount of reserved bandwidth available on desired routes. Also, remember that in the event of a major network outage, many other firms may be vying for these same spare routes.

Yet the situation is much better on the T-1 front, where users have the ability to reconfigure their networks on demand. The underlying driver for this capability is usually disaster recovery and outage resolutions.

For instance, Yellow Freight Corp. uses AT&T's Accunet Bandwidth Manager (ABM) network reconfiguration service to route its traffic to a Comdisco Disaster Recovery Services, Inc. recovery site should its headquarters face an outage or disaster. The ABM service includes workstation-based software that enables users to tap into AT&T DACS equipment and reconfigure their T-1 circuit route. In Yellow Freight's case, the service enables the company to reroute traffic from a company location to the Comdisco facility when a disaster occurs.

MCI offers similar features through its Digital Reconfiguration Service (DRS)-Dynamically Allocated Bandwidth and DRS-Network Reconfiguration.

WilTel has its WilBand Reservation System, which can be accessed via its WilView network management terminal.

Sprint is likely to announce a private-line management module for its Insite Executive network management offering within the next six to 12 months.

PRICING

While carriers are offering new speeds, reliability and management options to make private lines attractive, they realize that pricing will keep users hooked. They have structured pricing to encourage customers to move to higher bandwidth private lines.

In July 1992, AT&T announced a total restructuring of all its private-line rates. It raised the rates for relatively low-speed services, such as 56K bit/sec Dataphone Digital Service, and multidrop circuits, while lowering the rates for fractional T-1 and T-1 services.

Above T-1, the break-even point between multiple T-1s and T-3 remains the same as it was last year. According to The Aries Group/MPSG, a consulting firm in Rockville, Md., users can purchase a T-3 circuit for less than the aggregate price of 10 T-1 circuits. That same T-3 circuit would have cost the same as nearly 12 T-1 circuits in 1991.

The most innovative price change during the past 18 months has resulted from discounts for local access purchased through an interexchange carrier. Interexchange carriers are basically buying in bulk from local providers and passing on discounts to end users.

This is in direct response to user complaints that high-speed access is the bottleneck for deployment of high-speed private-line service.

Both AT&T and MCI now have volume discount plans for local exchange access. AT&T's T1.5 Access Multi-Service Volume Pricing Plan announced last May is an extension of its Multi-Service Volume Pricing Plan.

The new plan provides customers that are signing up for a five-year contract with as much as 24% off local access prices. MCI's Access Pricing Plan can knock off as much as 20% of the access charges for a three-year commitment.

What's significant about MCI's new access pricing scheme is that it is based on the user's area code and local exchange code designation rather than the more traditional circuit mileage method.

This was done to mute any advantage that AT&T's pricing might offer due to the fact that AT&T has more POPs and, therefore, reduces the average distance to a customer site.

Also significant in MCI's plan is the fact that users are given a choice of local access providers where available. Other carriers have customer-specific arrangements for bulk pricing of customer access to the network.

THE CHANGING FACE OF NETWORKING

The improved network reliability, enhanced network management and more cost-effective pricing may not be enough to totally stem the flow of applications to the public network.

Yellow Freight's network now consists of 550 shipping terminals and 26 regional hub sites connected to its headquarters in Overland Park, Kan., in a star configuration. The hub sites and terminals all employ private-line connections now, but that may not be the case in the future.

Dave Hack, Yellow Technology Services' manager of telecommunications, says the company will consider swapping out the hub-to-headquarters links for public frame relay if the need for hub-to-hub communications arises. However, he says the firm is not anxious to convert 550 shipping terminal locations to public facilities.

AT&T's price for the interexchange portion of a 1,500-mile T-1 circuit has dropped dramatically since 1985, according to Economics and Technology, Inc. of Cambridge, Mass.

1985	$40,400
1989	$19,800
1993	$8,170

Some watchers predict that private facilities will be used to connect islands of frame relay, SMDS and ATM service. For instance, sites in one region that are linked via a public network facility can be linked to sites in another region via a private line.

The mapping between different public-service addresses in each region can be done by routers at either end of the private line.

THE FUTURE

How carriers provide private circuits may also change in the long run as carriers deploy ATM backbones. These ATM backbones will support circuit emulation, allowing for virtual private lines to support constant bit rate applications at high speeds.

In other words, the user will still get the same private line-type service but the circuit will consist of a statically allocated path across a switched ATM backbone.

In the long run, users may simply opt for different pricing plans for bandwidth rather than choosing distinct services. For instance, a user with bursty LAN-to-LAN traffic might pay for a small amount of constant bandwidth combined with the ability to add bandwidth on demand. Users with voice and video applications would buy bandwidth in chunks and forgo charges for unneeded dynamic bursting capabilities.

"The services carriers will offer will not fit today's descriptions," says Andrew Greenfield, product manager at Stratacom, Inc., a San Jose, Calif., provider of cell-based switching products.

Another issue connected to the future of private lines is the upcoming availability of Synchronous Optical Network (SONET)-based service at speeds of up to 622M bit/sec. SONET can provide leased lines and comes in three speeds: Optical Carrier (OC)-3 that offers 45M bit/sec, OC-12 that offers 155M bit/sec and OC-48 that offers 622M bit/sec. Users will be required to employ private SONET-based trunks to access carrier ATM services as well as for wide-area transport in much the same fashion that private digital trunks are used today.

All the major interexchange carriers claim that they will offer SONET services in the late-1994 time frame, which will require that they upgrade their current T-3 backbones to SONET.

This means that users who have a real need for ultra-high speed bandwidth will have a private alternative in the same time frame when public networking services with similar throughput capacities will be coming on-line. Already, SONET services are being offered by many of the local exchange carriers and competitive access providers.

How aggressively the regional Bell operating companies price SONET access trunks will have a large impact on the acceptance of both private wide-area SONET trunks and public network services at speeds of 45M bit/sec and above.

"Competition in the interexchange market will continue to drive long-haul prices down, but local access is still lagging behind," says Susan Gately, vice president of Economics and Technology, Inc., a Boston consultancy. "Eventually, competition will drive lower pricing there."

Much of this is down the road. While it is certain that public services will continue to grow in popularity, carriers will continue to enhance and expand private-line offerings.

This increasing competition between public and private services translates into lower prices and greater choices for users. Managers can mix and match services in any number of hybrid configurations.

Someday, users may be drinking freely from the ATM spigot, but high-speed private services will provide a proven cost-effective option for the next five years.

"My network meets today's application needs," says Yellow Freight's Hack. "I don't expect that to change overnight."

Finn is a senior analyst with TeleChoice, Inc., a Verona, N.J., consultancy specializing in strategic planning and analysis of intelligent networks, services and applications. He can be reached at (201) 239-0700 or via MCI Mail at DBRIERE (445-4690).

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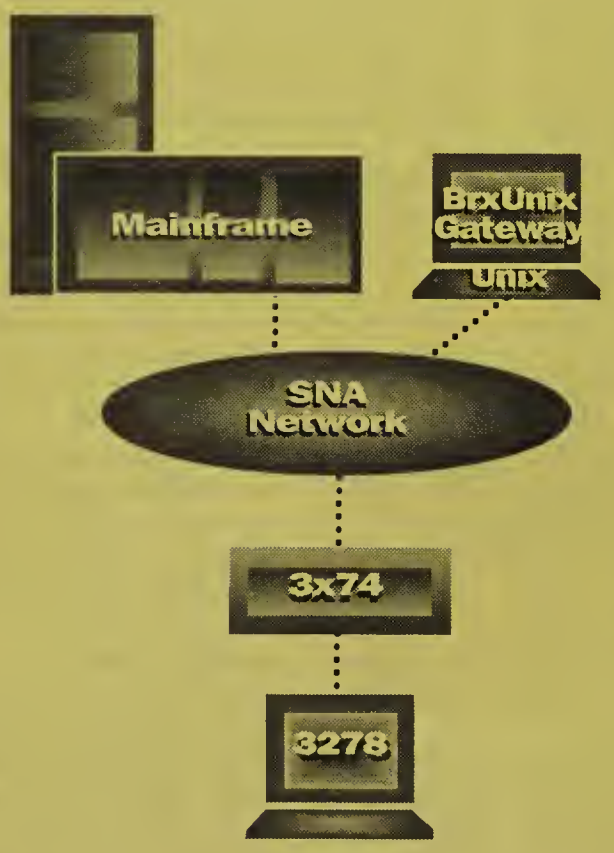

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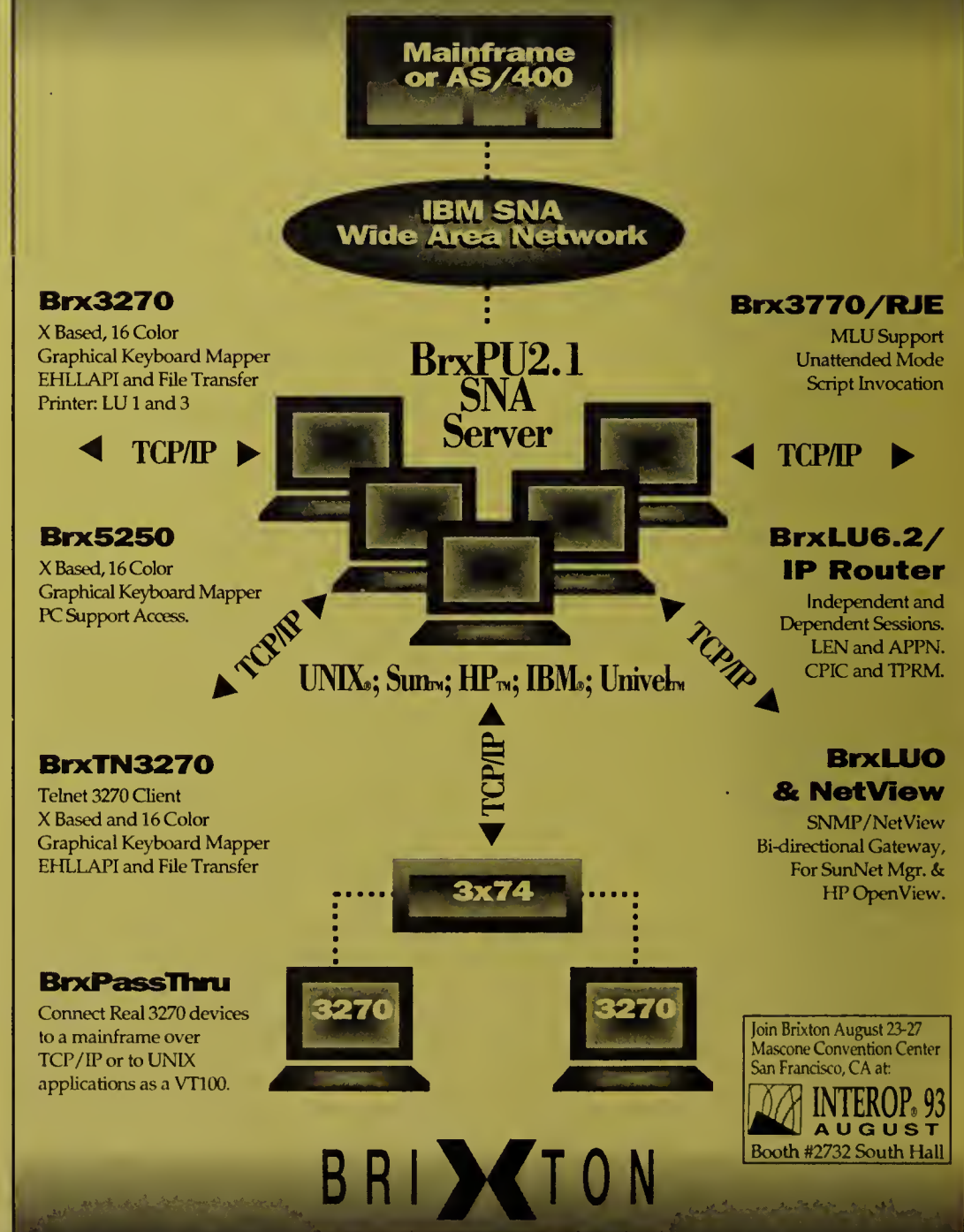

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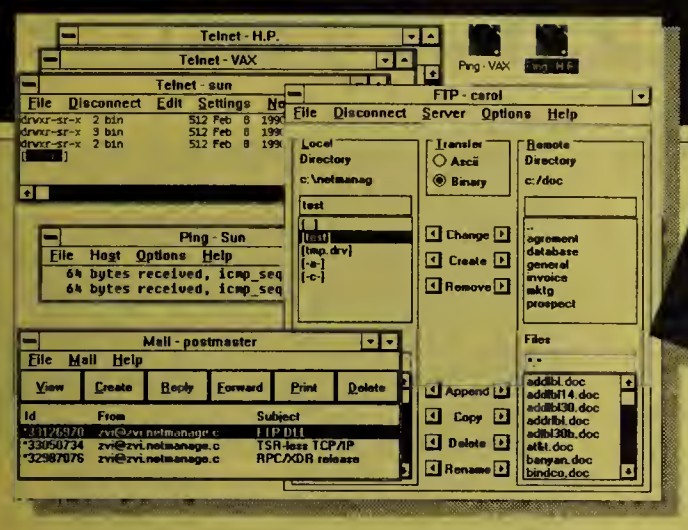

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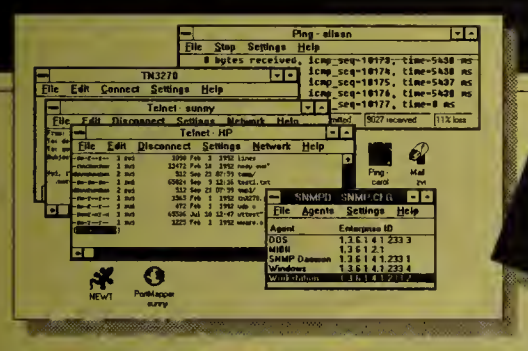

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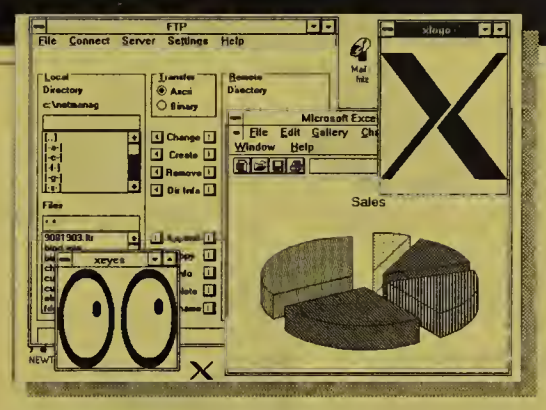

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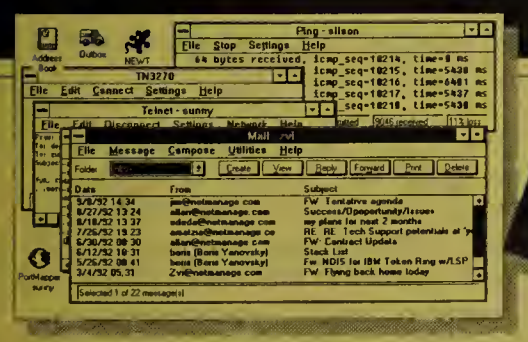

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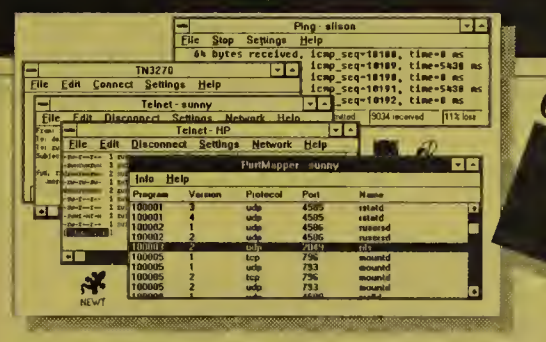

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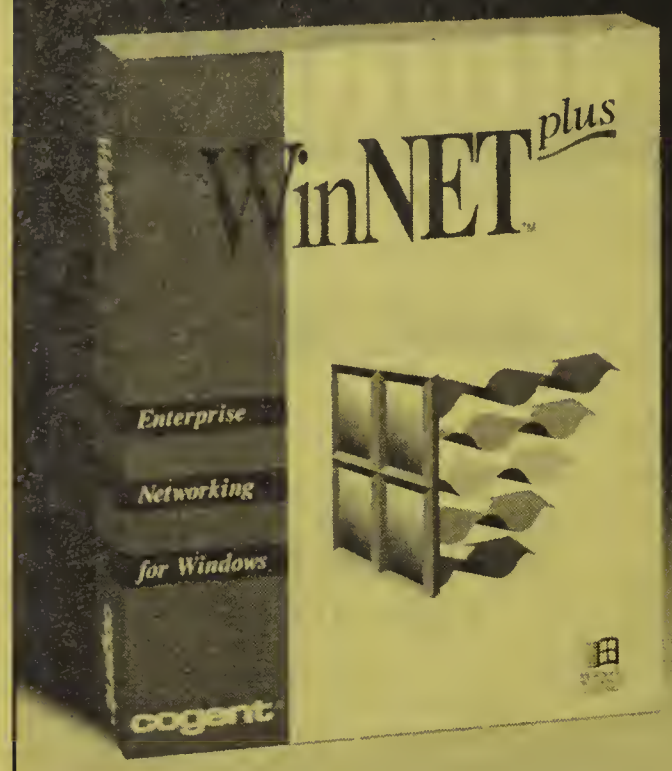

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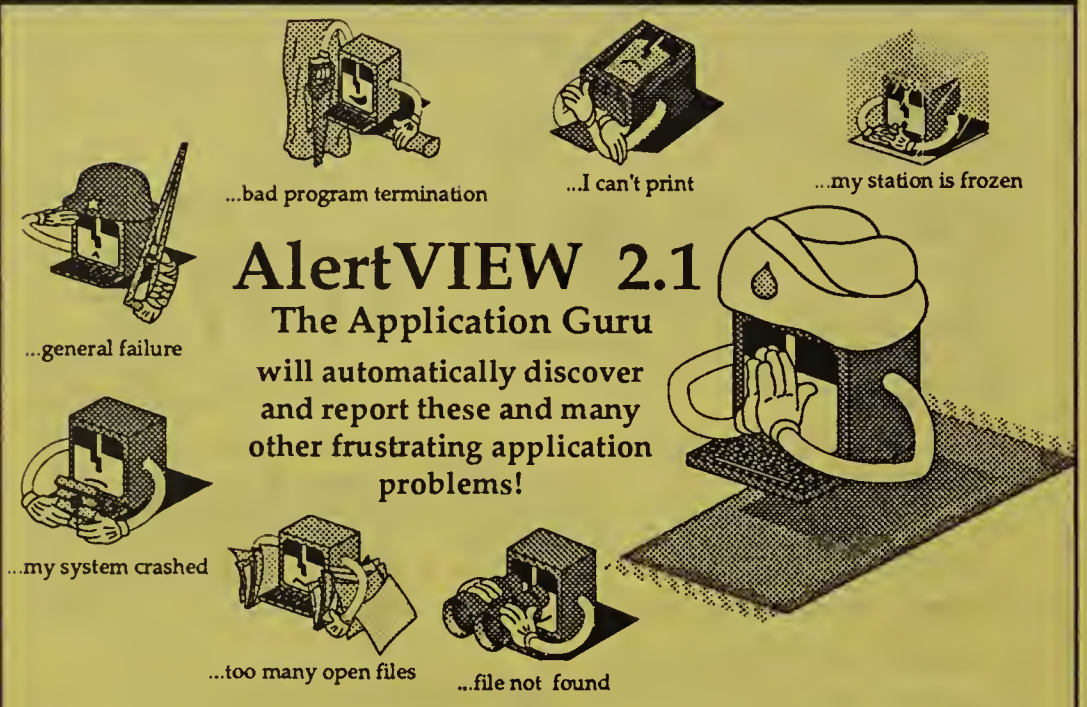

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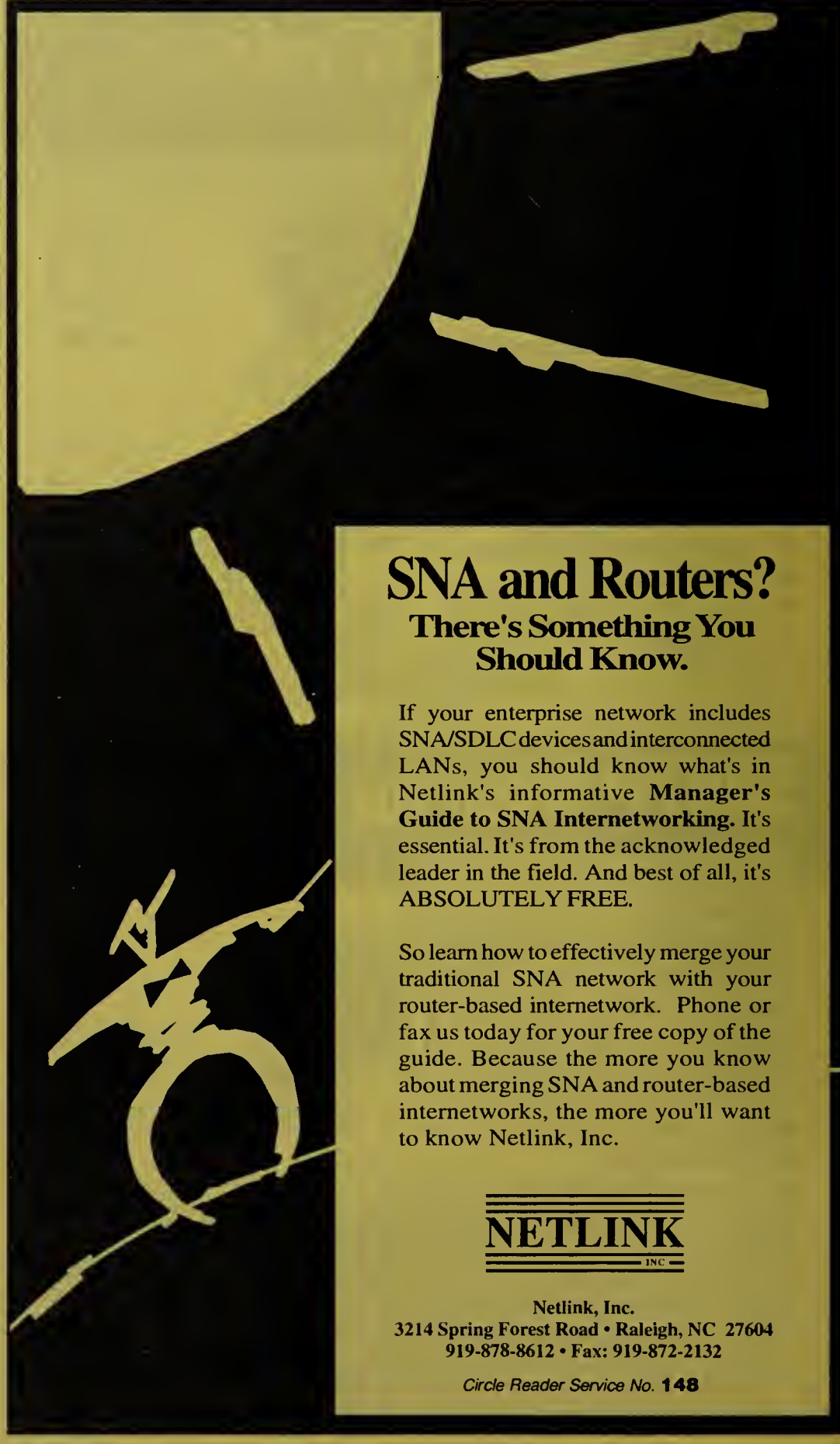

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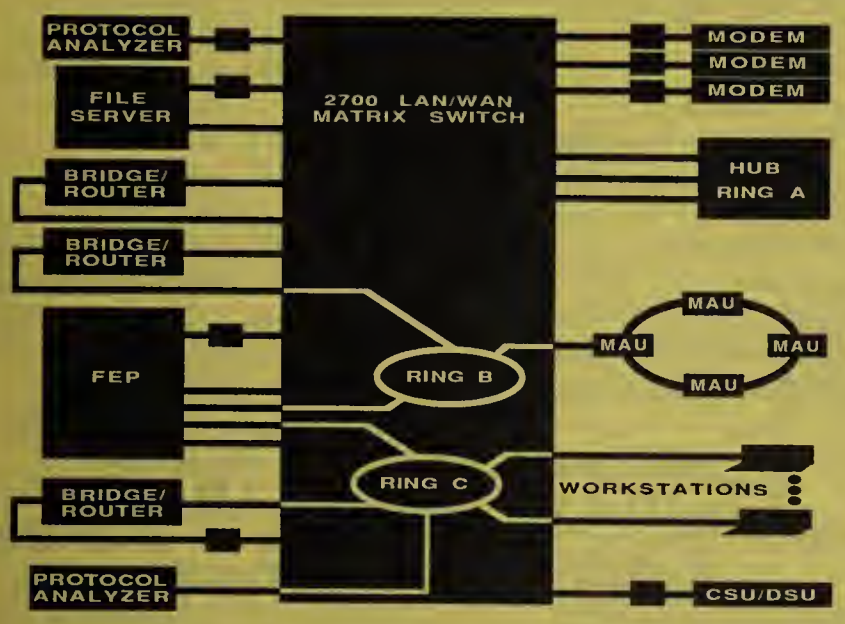

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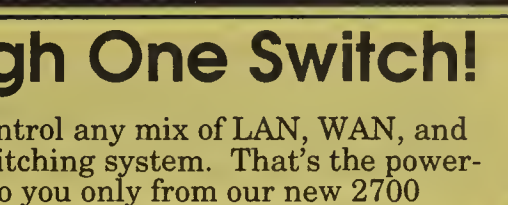

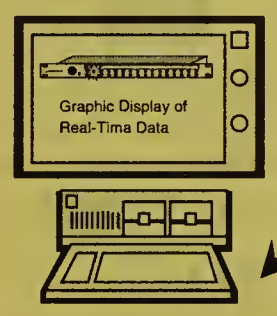

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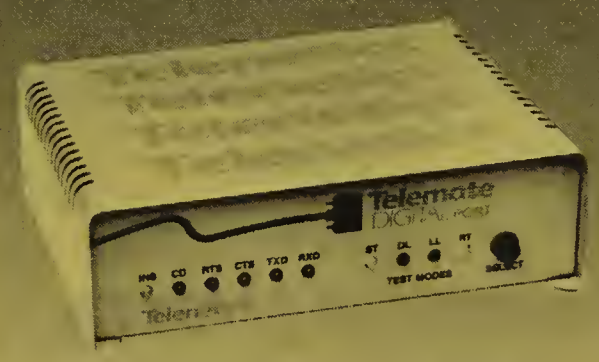

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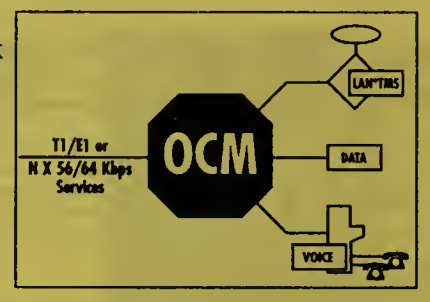

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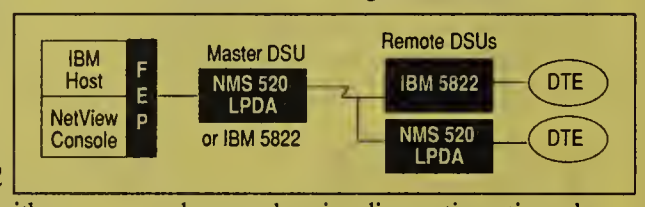

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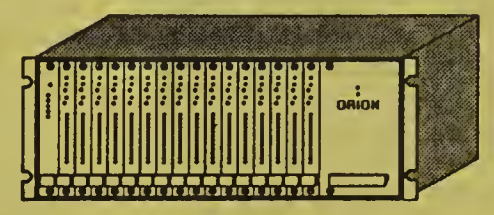

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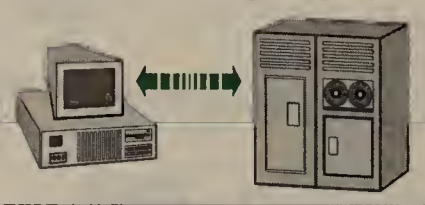

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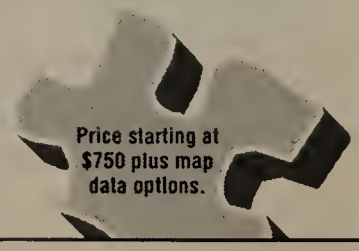

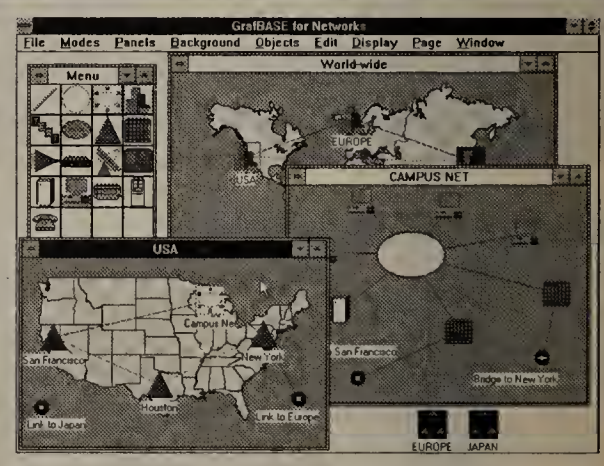

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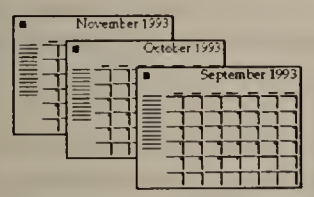

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CompuServe details global net direction

BY BOB WALLACE

Dublin, Ohio

CompuServe, Inc. last week mapped out plans to better integrate traditional Systems Network Architecture and remote LAN users into its value-added network (VAN).

The carrier also detailed the broadest expansion to date of its international packet-switched data network.

CompuServe said the moves will help it retain customers that are downsizing from IBM mainframe-based environments to distributed Advanced Peer-to-Peer Networking (APPN) setups and attract others with multiprotocol local-area network internetwork traffic.

"We firmly believe SNA and LAN traffic can coexist on our Frame-Net frame relay network," said Dennis Brouwer, manager of product marketing for CompuServe's Network Services Division.

The VAN plans to convince SNA users to abandon their slow, sprawling multidrop private-line networks for its Frame-Net frame relay service, a move that could save users money and improve performance.

CompuServe said it will entice users by packaging Sync Research, Inc. Frame Relay Assembler/Disassembler (FRAD) with its Frame-Net service.

This enables users with large numbers of remote terminals to maintain SNA sessions locally and transmit data across the frame relay network only when necessary, as opposed to keeping a dedicated line open. It also reduces the likelihood of session timeouts.

The Synchronous Data Link Control FRADs convert SDLC traffic from a terminal controller into Qualified Logical Link Control traffic and send it over CompuServe's frame relay net to a FRAD at the host site, where it is converted to SDLC or Logical Link Control 2 format and passed to a front-end processor for delivery to the host.

REMOTE POSSIBILITIES

In addition to detailing its SNA strategy, CompuServe laid out plans to support remote users that need access to corporate LANs.

CompuServe expands abroad

Fiscal-year 1993 as of May 1:

- Zurich, Switzerland
- Berlin, Stuttgart, Hamburg and Dusseldorf, Germany
- Manchester, Birmingham, Bristol and Reading, U.K.
- Brussels, Belgium
- Amsterdam
- Stockholm, Sweden
- Paris

Fiscal-year 1994:

- Calgary, Winnipeg, Halifax, Regina, Quebec and Saskatoon, Canada
- Milan, Italy
- Vienna, Austria
- Madrid and Barcelona, Spain
- Edinburgh, Scotland

CompuServe will extend its net by installing MicroNode packet switches in each of these cities.

SOURCE: COMPUSERVE, INC., DUBLIN, OHIO

GRAPHIC BY TERRI MITCHELL

The company plans to offer remote control and remote node applications bundled on top of its network.

With the first offering, called Remote Control, a remote user installs a server device next to his DOS-based personal computer and locates one on the LAN. Special server software converts X.25 traffic to the appropriate LAN protocol, Brouwer said.

With the remote control capability, users can establish dial-up links to devices such as personal computers and hosts on a LAN. Once a session between the local and remote devices is established, only screen and keyboard data is sent over the link to the remote user, Brouwer said.

With the remote node capability, applications reside on the end user's PC, which logs on to the LAN and gets full node privileges.

In addition to offering remote LAN access, CompuServe said it is upgrading about 200 low-speed modems to support 9.6K bit/sec access. It will begin supporting 14.4K bit/sec in the fourth quarter.

REACHING OUT

The company has been extending the reach of Frame-Net while developing and deploying new data offerings.

CompuServe, which standardized on the StrataCom, Inc. IPX as its frame relay switch in 1991, is installing that vendor's Broadband-PX cell relay switches and linking them via T-3 lines to handle heavy traffic between major metropolitan areas, Brouwer said.

Bill Truesdell, international network services marketing manager for CompuServe, said the VAN will extend its network to reach six new countries and Hong Kong in this fiscal year and add sites in countries currently served (see chart, this page).

CompuServe is also linking its international network with Telepac in Switzerland, Mercury Communications, Ltd. in the U.K. and Transpac in France.

By year end, the VAN provider will extend its Frame-Net frame relay service to Amsterdam; Brussels, Belgium; Madrid, Spain; Milan, Italy; and Paris.

CompuServe will also launch a frame relay network monitoring service based on Digital Equipment Corp.'s PolyCenter network management system that will monitor data service units, routers and permanent virtual circuits.

Cisco

Continued from page 1

user interested in APPN's development.

In the wake of IBM's moves, many questioned the need for APPI. Worse, industry observers believed the evolution of two competing SNA routing schemes would lead to confusion and serious interoperability problems, which prompted *Network World's* Reader Advocacy Force to call for the APPI Forum to fold its efforts into the newly formed AIW (*NW*, March 22, page 1).

APPI Forum members will meet at INTEROP 93 next week, and members who were contacted said they do not expect the group to survive. Most said they will focus their efforts on APPN and DLSw, a proposed Internet Engineering Task Force standard for supporting SNA traffic on TCP/IP backbones. Cisco, in fact, spearheaded the development of a DLSw group within the AIW and earlier this month announced it will support DLSw on its entire line of routers by mid-1994.

Industry observers believed the evolution of two competing SNA routing schemes would lead to confusion and interoperability problems.

"I'm very pleased. We got from IBM what we wanted to get, and IBM seems to be playing it straight," said Bill Donovan, SNA product marketing manager at Proteon, Inc. "With that accomplished, APPI is no longer revelant," he added, echoing other members' sentiments.

However, Cisco's Zadikian warned that APPN still is not fully open and that IBM still controls its evolution."

Those who now see APPN as open may have a false sense of security," he said. "APPI has gone a long way toward opening up APPN, but we need to work hard in the AIW to open it even further."

Sue Sabatino, senior product manager for IBM connectivity products at Cabletron Systems, Inc., concurred.

"As a result of the APPI Forum, IBM is accepting input from developers and users," she said. "But there are still about 17 patents on APPN. That's something vendors need to discuss in the AIW to determine if we should push IBM to open [them] up."

Analysts agreed that the APPI Forum was a success overall. "Cisco set out to pressure IBM into opening up APPN, and it worked. They also set out to garner support for the idea of routing SNA over TCP/IP, and that's worked — to a lesser degree," said Todd Dagres, director of communications at Boston-based The Yankee Group consultancy.

But leading a bold charge typically involves risk, and some analysts said Cisco's image will likely be sullied by APPI's demise. Rick Malone, a principal at Vertical Systems Group in Dedham, Mass., said APPI is another in a growing litany of abandoned projects.

Cisco last year pulled the plug on an ambitious, high-profile effort to provide native SNA support by enabling its routers to fully emulate IBM PU 4 devices. This spring, Cisco and SynOptics Communications, Inc. scrapped plans for the so-called RubSystem, which would have integrated Cisco's high-end routing capabilities into SynOptics' next-generation hub.

"APPI did have a number of positive effects. But Cisco has also done users a disservice by pushing something they had no real control over in terms of their ability to deliver," Malone said. "It's unfortunate because many users make plans based on their vendor's strategy."

Don Listwin, Cisco's director of marketing, said "We react to what the user wants. PU 4 emulation, for instance, was a capability users pushed for, but after some development work, we found it wasn't something users wanted."

StarWare packs offer Unix users links to IBM minis

BY CHRISTINE BURNS

Berkeley, Calif.

StarWare, Inc. is expected by the end of the month to roll out three software products that let Unix workstations and servers transfer files and electronic mail as well as send print jobs to IBM's mid-range Application System/400, System/36 and System/38 machines.

Each StarWare product comprises a pair of modules: one that sits on the Unix machine and one that resides on an AS/400, System/36 or System/38 processor. They support Unix machines from Bull HN Information Systems, Inc., Hewlett-Packard Co., IBM, Sequent Computer Systems, Inc. and Sun Microsystems, Inc.

Star5250 allows a Unix workstation to emulate an IBM 5250 terminal. It lets Unix users access applications or files stored on the AS/400, System/36 or System/38. A single Unix workstation version of Star5250 costs $795, while a multiuser version for a Unix server that supports up to 255 users is $8,995.

StarTools is a set of utilities that takes advantage of the 5250 terminal session between the Unix machine and the mid-range box. It offers a file-transfer utility that can ship data between systems at a rate of up to 1M byte every 5.2 seconds.

The remote command utility of StarTools allows a Unix client to issue commands to the AS/400, System/36 or System/38 machines to initiate an application or open a file stored there. A remote printing utility enables a Unix user to send files to a printer connected to the IBM mid-range computer.

StarWare's third product, StarMail, provides a gateway for UnixMail users to send and receive E-mail messages from IBM's OfficeVision users. The StarMail gateway lets UnixMail users view OfficeVision E-mail addresses as a set of local UnixMail addresses. When a message is sent from a Unix user to an OfficeVision address, the gateway routes the data to the appropriate address on the OfficeVision side.

StarTools and StarMail cost $4,995 and $5,995, respectively, for an unlimited number of users.

✆ StarWare: (510) 704-2000.

Alantec

Continued from page 8

Routing Protocol (DVMRP), which is a Routing Information Protocol (RIP)-based group addressing scheme.

PowerHubs only support local routing, but PowerHubs running DVMRP can communicate with one another across a wide-area network using an encapsulation technique on non-DVMRP routers.

The DVMRP packet can be wrapped inside a standard protocol such as the Transmission Control Protocol/Internet Protocol and routed across the WAN, with the receiving PowerHub stripping off the TCP/IP header.

In a similar move last week, Proteon, Inc. announced support for the Multicast Open Shortest Path First (MOSPF), which performs the same function as DVMRP but is based on OSPF (*NW*, Aug. 16, page 11).

"Since the PowerHub is essentially a desktop connectivity device and most users rely on RIP as their routing protocol, it made sense for us to support DVMRP first," Lind said. "OSPF is coming, and we're planning to support that in the PowerHub as well as MOSPF in the near future."

IP multicast routing for the PowerHub is currently in beta test.

Available in October, it will be included free of charge in all PowerHub System Software Releases Version 2.4 and higher.

✆ Alantec: (800) 252-6832.

StrataCom

Continued from page 1

speeds, so we're excited that StrataCom is bringing out such a capability," said David Nelsen, product manager of AT&T's InterSpan service. "We'll now be able to provide ATM service to those locations that can't cost-justify a full T-3 interconnect to an ATM network."

BT, CompuServe, Inc. and WilTel, which also use the StrataCom switches, said they too are interested in offering T-1-based ATM services and will evaluate StrataCom's new offering.

Rick Malone, a principal at the Dedham, Mass.,-based Vertical Systems Group, said StrataCom is the first vendor to announce an ATM interface to run at T-1 speed and expects that others will soon follow suit.

"ATM at T-1 opens up a major opportunity to make ATM more attractive since there are very few users that have a great need for T-3 internetworking or that can even afford it," Malone said. "The vast majority of users have wide-area line speeds between 56K bit/sec and T-1."

StrataCom's T1/E1 ATM card complies with the ATM User Network Interface standard and will enable users to forge a T-1 link to the IPX or BPX from devices such as a router or ATM hub, said Brian Button, StrataCom's director of product marketing.

The card will come equipped with an integrated data service unit/channel and will likely support either one or two ports, although that decision has not been finalized.

The T1/E1 ATM card will be available in the second half of next year and will cost between $12,000 and $18,000 per port. Button noted that StrataCom is also working with AT&T and Cisco Systems, Inc. to jointly develop an ATM-to-frame relay gateway for the IPX and BPX switch that will let users support a mix of ATM and frame relay traffic on the same net.

AT&T, Cisco and StrataCom last spring developed a technique for mapping frame relay formats to ATM. A document describing the technology has been submitted to the ATM Forum and details how the three companies plan to achieve interoperability between frame relay and ATM devices.

The gateway will be available the second quarter of next year at no extra charge. StrataCom said its ForeSight software, which currently improves the efficiency of frame relay nets by filling gaps in data streams and anticipating and preventing link congestion, will soon be available on the BPX for use with ATM nets.

The ATM ForeSight software will continuously monitor the utilization of ATM trunks and adjust the bandwidth of all connections to avoid queuing delays and dropped cells. According to StrataCom, the software will enable the net to run at 90% utilization, as opposed to 50% to 60% utilization without a feedback control mechanism. Malone said he agreed that effective congestion management and sophisticated queuing features are critical when loading up a T-1 pipe with ATM data.

The ATM ForeSight will be available by year end. Pricing for the software option has not been set.

✆StrataCom: (408) 294-7600.

Codex

Continued from page 1

expect the module to be announced later this year.

Each LAN card features one Ethernet or one 4M or 16M bit/sec token-ring attachment. Each serial card supports two V.35 or X.21 interfaces at speeds up to 384K bit/sec.

The 6520 features two WAN links running at speeds up to 384K bit/sec. For passing LAN traffic onto a WAN, the 6520 supports the Open Shortest Path First, Routing Information Protocol and Exterior Gateway Protocol routing protocols, sources said. It can route Internet Protocol and Novell, Inc. Internetwork Packet Exchange (IPX) data.

The routing protocols were licensed from Proteon, Inc.

The switch supports source routing and source routing transparent bridging for linking token-ring LANs. It also supports local Logical Link Control 2 (LLC2) termination for remote polling of synchronous terminals. In the future, it will support Synchronous Data Link Control-to-LLC2 conversion, as well as voice and video modules. SDLC-to-LLC2 conversion will allow the 6520 to add IBM SDLC traffic to LAN internet backbones by replacing SDLC headers with LLC2 headers.

The voice and video modules, along with the LAN and serial cards, will let users combine voice, data, LAN and video traffic over the same access link. Availability dates for the SDLC-to-LLC2 conversion feature and voice and video modules were unavailable.

The 6520 allows users to transmit serial protocols in native mode instead of encapsulating and routing them in IP packets. This saves on processing overhead because IP headers do not have to be added to serial frames.

Instead, the 6520 statistically multiplexes LAN and serial traffic onto the same wide-area link, dynamically allocating bandwidth on an as-needed basis. Data is then sent to a private frame relay, X.25 or, in the future, cell relay net, or to a carrier central office for access to switched backup lines.

The 6520 also features transmission prioritization that lets users define which protocols have priority access to bandwidth. Based on those definitions, buffer queues storing delay-sensitive data are emptied out first.

Initially, the 6520 will go up against similarly priced low-end routers from Cisco Systems, Inc. and Wellfleet Communications, Inc., according to sources. Pricing for the 6520 starts at $4,200, which includes one Ethernet and five serial ports. It will be available in December.

✆Motorola Codex: (508) 261-4000.

Role reversal

Continued from page 1

cated throughtout the state.

"As a financial institution, issues such as reliability and integrity of data are extremely important, and our SNA net provides that," said Jack Frans, a programmer analyst at CCB.

The idea of using routers was not really considered at CCB due to cost concerns. "It's a wonderful idea, but it costs a whole lot of money," he said.

The company is instead using Automated Programming Technologies, Inc.'s (APT) APTnet LAN product to facilitate messaging between branch offices.

APTnet LAN is an application-level gateway that acts as an alternative to bridges and routers for transmitting data between LANs across an SNA network. The product supports NETBIOS, Novell, Inc. Internetwork Packet Exchange (IPX) and Transmission Control Protocol/Internet Protocol traffic.

CCB uses APTnet LAN to support its hot-line messaging application, which Frans said consists of timely information that must be dispersed to all branches.

If a customer comes into a branch and reports his checkbook stolen, for example, the branch manager notifies the help desk, which operates from a LAN in Durham.

Help desk personnel then send a hot-line message and a corresponding distribution list to the APTnet LAN gateway, which consists of software on a LAN-attached server.

BOB DONOVAN

FRANS

The gateway encapsulates the message in an SDLC packet and routes it to the IBM 3090 mainframe, which in turn, forwards it to each server on the distribution list. The servers then route the message to each appropriate personal computer at the local level. The system gives CCB tight control and accountability over the process because the host can generate an acknowledgment report detailing who received the messages.

The product also allows users on one LAN to access resources on remote LANs across the SNA backbone, but CCB has limited this capability because of security concerns. Plus, this type of access is not yet needed, although it may be in the future.

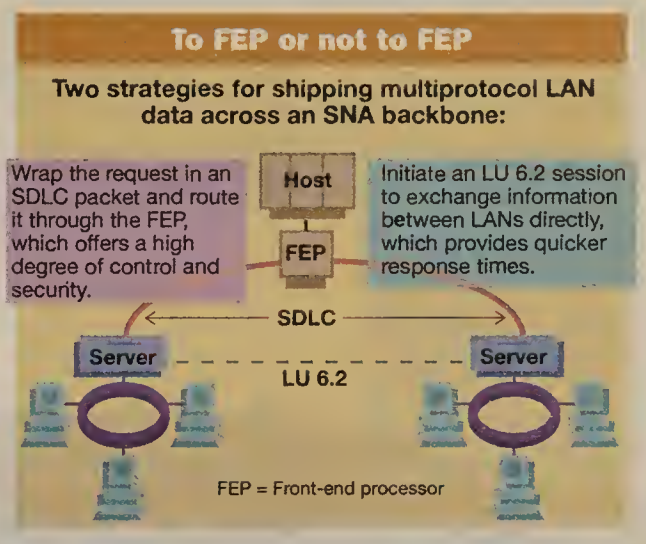
Users requiring quicker response times than host-based products provide can employ an LU 6.2-based LAN connectivity product, which offers faster, direct connections between LANs. IBM was one of the first vendors to offer a product in this class with its LAN-to-LAN Wide Area Network (LLW) offering, which lets NETBIOS-based communications flow over SNA links using LU 6.2 sessions.

While Big Blue is planning to add IPX and TCP/IP support to LLW by the end of the year, Computer Communications, Inc.'s Eclipse 7020 router offers IPX and TCP/IP support now.

P&O Containers, Ltd., a manufacturing firm in London, is testing that product, which can also be configured as a host-based solution that uses SDLC encapsulation to communicate between LANs via a FEP.

The company created a test environment with two token-ring LANs and a FEP. In the first test, it took TCP/IP traffic from one LAN, encapsulated it in an SDLC packet and routed it to the second LAN via the FEP. In the second test, the same traffic was carried via an LU 6.2 session directly to the second LAN.

"Both approaches were used successfully, but we found that going through the FEP resulted in about 10% degradation in response times when compared to the LU 6.2-based method," said Stanley Stewart, senior network analyst at P&O Containers.



The chief benefit of either the host- or LU 6.2-based approach is that users can keep their SNA backbones and reap the reliability inherent in the architecture, according to Anura Guruge, an independent strategic consultant based in New Ipswich, N.H.

"The bottom line for these users is ensuring the integrity of the mission-critical applications that are the lifeblood of their businesses," he said.

Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J., said most users today indeed employ parallel SNA and LAN internetworks. But for a select group, the LAN-to-LAN over SNA approach makes sense.

"Normally, the only reason users would deploy an LLW approach or something similar is because they have a very strong security requirement as well as a low requirement for LAN-to-LAN connectivity," he said.

"These users are overwhelmingly LAN-to-host shops," he added, "and their LAN-to-LAN activity is so small, it would not be responsible for them to develop a parallel network structure to support it."

NETWORK WORLD

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Attached to this week's issue is an easy-to-complete entry form that will get you into the running for the awards.

Winners of this year's User Excellence Awards will be featured in a special issue of *Network World* on Nov. 22 and will be invited to participate in an awards ceremony at the ComNet conference in Washington, D.C. in January.

If the entry form is missing, please call us at (800) 622-1108 for more information. All entries must be received by Sept. 13.

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I encourage you to enter today. Good luck!

Thanks,

John Gallant

John Gallant
Editor

NETWORK WORLD
THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

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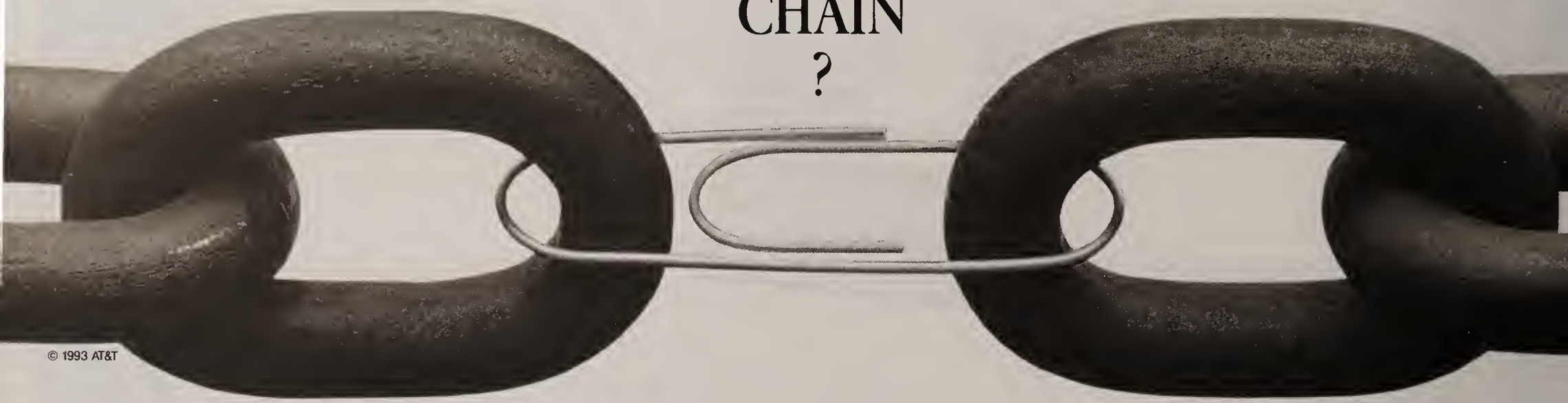

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Please submit a 250- to 500-word abstract explaining how networking has helped your organization achieve its strategic goals. How has networking helped you differentiate your products and services from competitors or launch new offerings? How has it enabled you to bring new products and services to market more quickly? How has it helped you reduce your operating costs? How have technologies such as electronic data interchange helped you build closer working relationships with customers, suppliers and other business partners?

The size of your network isn't important; what matters is how networking has helped your company achieve its objectives. Only entries submitted by users will be considered. No vendor-supplied customer nominations please.

Please print your abstract on a separate sheet and return it with an entry form via MCI Mail (Network World 390-4868), by facsimile at (508) 820-3467 or by mailing your entry to: Special Projects Editor, *Network World*,161 Worcester Road, Framingham, Mass. 01701.

Please be sure to include your name, title, address and phone number.
All entries must be received by Sept. 13.

Get the recognition you deserve for your innovative networking efforts by entering *Network World's* Ninth Annual User Excellence Awards today!

Good Luck!

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